DOMESTIC ENGINEERING

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A Silver Lining

There are so many master plumbers in business who have to struggle hard for recognition, and so very few who have reached that gratifying state where recognition of their good work has been accorded them, that it is with pleasure we relate the business experience of one of our subscribers in his own words. He says:

"I beg to state that during the 35 years of business experience, I have never suffered a break, lost a dollar, or even a patron, save by the hand of death—a most happy business life; for which the writer thanks Almighty God, not only for the business that has afforded a livelihood, but for the blessed memories of the past, and the associations with those who never lost sight of the advantages of mutual relationship. Not a contract in 20 years—all day-work. I was the first plumber in the city to fit up a showroom with fixtures supplied with 'water on,' about 18 years ago."

The foregoing is indeed a remarkable document, human in the extreme, and shows unmistakably that even in this cut-price age a business can be built up without competition on a basis of mutual confidence. Perhaps the key to this man's success is to be found in this line: "and the associations with those who never lost sight of the advantages of mutual relationship." It is this intimate relationship and well founded confidence which builds up a lasting relationship, business or otherwise, between two or more people. The owner who disputes an honest bill of the plumber, makes him wait long weary months for his money and is always looking for something about which to find fault, cannot expect to gain the good-will of contractors and have them anxious for his work, like the honorable owner who insists on what he pays for but is satisfied with that and pays his bills promptly. On the other hand, the contracting plumber who takes advantage of his customers' confidence and betrays it by exorbitant charges for work, or by using inferior goods, loses sight of that mutual relationship from which advantages, lasting good-will and esteem arise.

Our friend's letter naturally leads to a subject which has long been on our mind. That is the almost total absence in the plumbing business of what is known in the business world as "good-will." A plumbing establishment may be located in a certain building two, ten or forty years, and its removal excites no comment, creates no interest. If the owner dies or wants to sell, he or his executors might dispose of the stock and office furniture and fittings at a sacrifice but rare indeed are the cases where he or they can demand and receive a bonus for the location and name under which the business was operated. A doctor, dentist, tinner, hardware man, druggist, clothier, dry-goods merchant, in fact a business man engaged in any other line, once he has established himself, can sell the "good-will" for a large amount without actual goods of the value of one cent. The name of a paper or periodical has a cash value of from $75,000 to $1,000,000 just because it has become established and has gained a good-will. Why, then, should the plumbing business be any exception to the rule? Why should twenty or forty years of effort end in nothingness? Surely a successful plumber in that length of time ought to have a good-will of a cash value of $10,000 or so!

Perhaps, we must look to the plumbing business itself for the reply. It is because the plumber never establishes his place of business in the real sense of the word. To him his shop and office are headquarters from which he carries on his operations, and the public is not invited to call and make purchases. As a matter of fact, they are discouraged from doing so, because a plumber is not permitted to sell goods he does not install.

The natural result is, that no matter how long he is in business the public is not aware of his existence, and it is the public in general, by taking its trade to a certain place or withholding it from there, that creates or withholds the good-will so valuable in other lines of trade.

This refusal of the master plumbers to sell without installing has resulted in the loss of untold trade to them as well as the loss of an established good-will. All the accessories of a bath-room which

now are sold by other merchants ought by right to be sold by the plumbers. To bring around this state of affairs, however, the plumber business men must become merchant plumbers as well as contracting plumbers. They must stock their stores with goods to sell direct to the consumers and use every known trade-means to bring the public to their places of business. This might, or might not necessitate a revision of the Baltimore Resolutions under which master plumbers now operate, but if the times have outstripped these resolutions and they are a drag on the plumbing business, preventing those engaged in it from realizing their full measure of compensation, it is then time for that part of the resolutions responsible for the state of affairs to be modified to meet the new requirements or lopped off altogether.

The truth of the matter is, plumbing business will never be what it ought to be until the master plumbers become merchant plumbers. There is no doubt but that there is a deep-seated prejudice against plumbers as a whole, and perhaps when all is considered, the public is not wholly to blame for the impressions it has received. It is not showing up the master plumbers in the best possible light to go into one of their stores for a few bibb-washers and be asked for them five or six cents apiece, then cross the street to a hardware store and get a dozen of the same washers for a dime. Such a difference in prices is not calculated to bring custom to the plumbers' shops, while it is quite natural for those who know of the differences in price to characterize the plumbers as "robbers."

It should be clearly understood by those engaged in the plumbing business that the Baltimore Resolutions apply only to plumbing fixtures and roughing-in materials at the most; that bath-room accessories like towel-racks, soap-cups, sponge-holders, yes, and even repair material for faucets and valves that the householder can use himself, do not come within the meaning of plumbing supplies as laid down by these resolutions.

If all the plumbers engaged in business would look upon the matter in this light, then stock their stores with everything salable which appertains to their calling, and advertise, so as to bring people to their stores to buy these supplies, there can be but little doubt that within a few years they would lose the odium attached to the name, would increase the profits of their business considerably, and would advance a long step towards that time in the future when a plumbing business, like all other enterprises, will possess a good-will.

The "Humdinger" is Going to be The Peer of all Humdingery.

CONTRACTS RECENTLY AWARDED.

Jonesboro, Ark.—E. H. Hill was recently awarded the contract for plumbing on the Jonesboro, Lake City & Eastern Railway, amounting to $500.

Fremont, Mich.—The G. E. Hain Co. has the contract for installing plumbing and heating in the new Congregational Church, now in process of erection. The specifications call for a hot-air heating system.

Chattanooga, Tenn.—Knoedler & Meredith have the contract for the installation of the heating system in two new schools now being erected at Dalton. This firm has just completed the heating installation in the Jasper high-school and in the new Methodist Church at Cleveland.

Buhl, Minn.—The Virginia Plumbing & Heating Co. is busy on its contract to connect the village hall and several business blocks with the village power-plant. The steam hitherto wasted will be utilized to heat as many buildings as possible.

Macomb, Ill.—Welch & Anderson have in hand two contracts in Bushnell, one for installing plumbing and heating in the home of C. E. Hunt, the other for plumbing and heating the new residence of Mr. Frisbie.

Princeton, Ind.—The Noble Plumbing & Heating Co. has been awarded the contract for all plumbing, heating and gas-fitting in the new Federal building. The award was made to this firm in competition with a number of bidders, representing Indianapolis, Chicago, Terre Haute, Logansport and Columbus. The hot-water system of heating will be installed, and all toilet rooms will be finished in marble.

Altoona, Pa.—The contract for repairs to the city hall heating plant was secured by F. S. Tierney.

East St. Louis, Ill.—The contract for installing a heating plant at the No. 1 fire engine house has been awarded to Kickham & Co.

Toledo, O.—The Robert Raitz Co. has the contract for installing heating and ventilating equipment in the public-comfort station and offices of the new Erie street market-house, its bid of $1,100 being the lowest.

Philadelphia, Pa.—H. L. Beck & Son will install heating apparatus in the Twentieth St. M. E. Church, at a cost of $1,250.

Macon, Mo.—G. A. Sparling has purchased the Wallace Plumbing Co. and will have personal charge. Mr. Sparling is a practical plumber, steam and hot-water fitter, and is well known in Macon, having been employed by C. C. Jacobs, the plumber.

Virginia, Minn.—M. Boylan & Co. report good business. Mr. Boylan has been at the branch office in International Falls, which has in hand the plumbing of the Rex Hotel and the three-story business block known as the Keyes Block, and has recently secured contract for plumbing a new three-story hotel building for Mrs. Annie Kelly.

Faribault, Minn.—P. J. Gallagher has received the contract for installing heating and plumbing systems in the Home for Aged Women at Eau Claire, Wis. The contract is a large one and Mr. Gallagher is giving it his personal attention.

Durant, Okla.—M. D. Michael has been awarded the contract for the plumbing and heating on the new courthouse at Coalgate, Okla. The amount of the contract is announced as $17,500.

Johnstown, Pa.—The contract for installing plumbing and heating in the new home of the Eagles at South Fork, Pa., has been awarded to the Johnstown Supply Co.

St. Paul, Minn.—The Healy Plumbing & Heating Co., 277 W. 3rd St., has been awarded the contract for remodeling the water-supply and plumbing systems in the state training school at Red Wing. The consideration is $8,705.

Pittsburgh, Pa.—The American Heating & Ventilating Co., of this city, has secured the contract for the installation of a heating and ventilating system in the new school building at Freedom, Pa. The consideration is $3,350.

Kitchens and Laundries

Their Planning, Arrangement, Equipment and Sanitation

By Wm. Paul Gerhard, C. E.

CHAPTER XI—LAUNDRY MACHINERY.

Some Details of Laundry Machinery Equipment.

A modern steam laundry, whether for an institution or a commercial enterprise, cannot be sucessful without the installation of a complete line of machinery. A large variety of such useful machines is now manufactured, as the catalogs of houses making a specialty of such apparatus show.

The principal machines in use are washing machines, centrifugal and steam roller wringers, steam cloths, dryers, power mangles, and ironing machines, but there are many others.

General requirements of all such machines are that they must perform the operations quickly and thoroughly, that the cost of running the machines by a steam engine or by an electric motor must not be excessive, and, above all, that they must cleanse and finish up the wash without tearing, damaging or ruining it, or staining the cloths with rust.

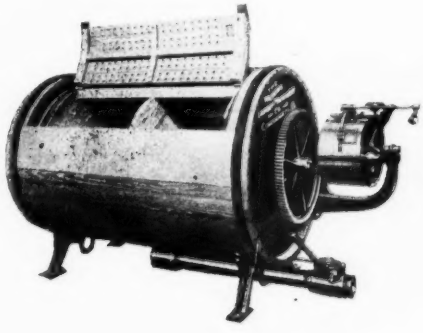

Fig. 24. Standard Wood Washing Machine.

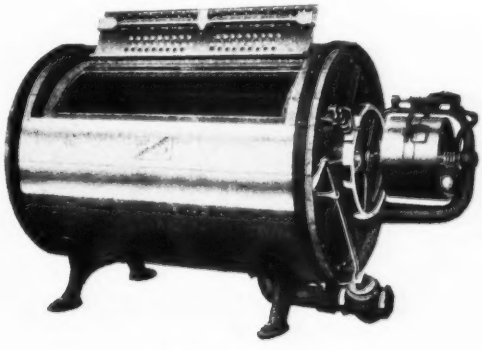

Fig. 25. Brass Cylinder Washing Machine.

Fig. 26. Troy Centrifugal Extractor.

It is not the writer's purpose to give a description of such machines which would be at all adequate and complete, but a few of the more important machines will be selected, described and illustrated from catalogs of the American Laundry Machinery Co., and the Troy Laundry Machinery Co.

Washing Machines.

Washing machines are appliances or apparatus for mechanically cleansing cloths, by agitating or rubbing them in a suitably constructed revolving receptacle, containing water, steam, soapsuds or some other detersive solution.

We may distinguish three principal types of washing machines, namely: First, the old dash-wheel type, in which the cloths are lifted and dropped; this style was at one time preferred for the washing of very dirty cloths, but at present it is not much used: second, the plunger washers or squeezing machines, which act by direct pressure, forcing the suds through the wash, and which are more used in Europe than here; and third, the present standard style of machine, which is sometimes called a "hydraulic washer."

All washing machines have in common the one advantage that very hot water or steam can be used in them, which is, of course, not possible when the cloths are washed by hand in tubs. In washing machines the cleaning properties of steam are combined with the chemical action of the soapsuds, the dissolving property of hot water, and the mechanical effect of friction and rubbing caused by the rotary motion.

The principal requirements of washing machines are that they must not ruin, tear or otherwise damage the wash; and that they should be quick in action and capable of being run economically. The hydraulic washer is composed of two concentric rotary cylinders, laid with the axis horizontally; the outer cylinder is usually of cast-iron but sometimes of wood, while the inner one, which holds the wash, is either of hardwood, trimmed with brass hoops, or else of copper or brass, the latter being better, but more expensive. The objection to wooden washing machines is that in course of time the wood absorbs impurities. The inner cylinder is perforated with numerous holes; it must be perfectly smooth inside and free from projections or sharp corners. The cylinders must be steam and water tight. The inner cylinder is turned by automatic machinery, first in one direction, and after several revolutions then the mechanism reverses. In this way the cloths are tumbled and mixed in the water and soap most thoroughly, and at the same time the cloths are prevented from packing together.

As a rule, washing machines are not directly connected with the waste pipes, but the outer cylinder or drum is provided with a 3-in. quick-opening gate valve, and the waste discharges openly over or into either open or covered troughs or gutters.

Fig. 24 illustrates a standard wooden washing machine of the Watkins type, both cylinders being constructed of red cypress, and having a sliding door.

Fig. 25 illustrates the Troy brass cylinder washer, with reverse movement. It requires a 2-in. water connection and a ½-in. steam-pipe connection; the waste-pipe is 3-in. This machine is made in various sizes. The improved all-metal machines are very durable and practically indestructible. Their capacity varies from 200 to 1,000 kg. of wash per day of 10 hours.

The soaking and also the rinsing of the wash are often done in the washing machines. Smaller machines are also made which are operated by hand.

Wringing Machines.

The wringing out of the wash to extract a large part of its moisture is performed either in steam roller wringers or else in centrifugal hydro-extractors. The former are similar to the ordinary wringers used in domestic laundries, and have rubber rollers between which the clothes are passed, those for large laundries being made of large size and operated by pulleys and belts.

The centrifugal wringers consist of two vessels set on a strong frame-work of cast-iron, with the axis vertical. Usually the frame consists of one solid casting, without joints or bolts to become loose by vibration. The outer vessel is of cast-iron; the inner one, which receives the clothes, of tinned copper with numerous perforations on the sides and in the bottom. The machines are run at a high rate of speed, making from 900 to 1,400 revolutions per minute. As the basket is about two feet in diameter, a point on its circumference travels at the rate of from 5,650 to 8,800 ft. per minute. The water is thrown out of the inner basket by centrifugal force, is gathered in the outer vessel, and flows from there through a waste discharging over a floor-drain or gully. These machines are superior to wringers, as they do not injure the wash. Fig. 26 illustrates such a machine as made by the Troy Laundry Co. It is called a hydro-extractor because it extracts moisture—from the Greek word hydor, water. It is usually estimated that 50 per cent of the moisture of wet cloths is removed by these machines. They must be strongly built because they run at a high rate of speed, and under a great strain. They are made in various sizes, and hold from 30 to 90 lb. of wash. The power required to run them is from 1 to 2 h. p.

(To be continued.)

THE FURNACE.*

Vest-Pocket Essay by George Fitch.

At this time of the year the furnace begins to come bitterly to our attention. It is a peevish ruin which makes its lair in the cellars of plain people and contrib-

"The Furnace Begins to Come Bitterly to Our Attention."

utes to the horror of winter by declining to give forth heat in a blizzard because the chimney wasn't manicured inside during the autumn.

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The furnace is composed of a large cracked firebox surrounded by a sheet-iron hogshead. It is operated by a system of checks and drafts, although one may, of course, pay cash and get just as good results. It is connected with the various rooms in the house by large tin pipes, which serve to transmit cuss words from the cellar to the upstairs, and it is connected with the chimney by a pipe which serves to transmit heat into yon high heaven. When a furnace is working vigorously a stratum of warm air a mile high over the house is sometimes produced. Thus the furnace is the sparrow's friend, but until some means of locating the living-room directly over the house is devised it will not be doing its full duty toward humanity.

The hot-air furnace is so named from the manner in which it is sold. We are led to believe, when buying a No. 13 furnace on an E last, that it will readily heat a 9-room house so thoroughly that a coat and vest will be entirely superfluous even on the front porch. This is only partially true. The furnace will not heat the house by means of the pipes and the registers, but if sufficiently flattered and encouraged it will eventually ignite the floors and make everything lovely and warm until the fire department arrives.

A furnace can be readily operated during the winter by one man if he makes arrangements to have his meals brought down cellar to him. By shoveling your spring overcoat, your club dues, your summer vacation and your winter's theater tickets into your furnace you can keep it burning all winter except on zero nights. A furnace is quite hardy and by wrapping an old carpet around it on very cold days you can keep it from becoming dangerously chilled!

Some people claim that they can run a furnace all winter on $24 worth of coal, and that by putting in two shovels full in the morning they can maintain a fierce heat until evening. Do not worry about these statements, however. Go ahead and discount them with claims of your own. This is a free country and everybody can lie in it.

GOVERNMENT CONTRACTS TO BE AWARDED.

Supervising Architect James Knox Taylor, Treasury department, Washington, D. C., will receive sealed proposals as follows:

Until 3 p. m. Dec. 7, 1911, for the construction of a 2-story and basement building of 4,700 sq. ft. ground area, stucco-faced, with stone and terra-cotta trimming, tin roof, non-fireproof, except first floor, including plumbing, gas-piping, heating apparatus, electric conduits and wiring, and lighting fixtures, for the U. S. post-office at Albany, Ore.

Until 3 p. m., Dec. 14, 1911, for the reconstruction, including plumbing, of the U. S. Marine Hospital, Stapleton, Staten Island, N. Y. The work consists of the construction of two three-story wings having a total ground area of 1,150 sq. ft., reconstructing the entire interior of the old building, and adding a fourth story to a portion thereof.

Until 3 p. m., on Dec. 19, 1911, for the construction complete, including plumbing, gas-piping, heating apparatus, electric conduits and wiring, and interior lighting fixtures, of a one-story and basement non-fireproof building of about 3,600 sq. ft. ground area, for the U. S. post-office at Paragould, Ark.

Until 3 p. m., Dec. 20, 1911, for the construction complete, including plumbing, gas-piping, heating apparatus, electric conduits and wiring, and lighting fixtures, of the U. S. post-office at Westfield, Mass. The building is one story and basement, and has a ground area of approximately 4,350 sq. ft.

Until 3 p. m., Dec. 27, 1911, for the construction complete, including plumbing, gas-piping, heating, electric conduits, wiring, and interior lighting fixtures, of the post-office, court-house, and custom-house at Miami, Fla. The building is of three stories, with basement and unfinished attic, and has a ground area of approximately 7,200 sq. ft.

All proposals should be in accordance with drawings and specifications, copies of which may be obtained from the custodians of the above sites or from the office of the Supervising Architect at Washington, D. C.

BOILER-RATING AGAIN.

Editor "Domestic Engineering":—I notice in the Nov. 4th issue of your valuable journal that our old friend, B. O. Iler, is seeking light on the much-discussed question of boiler tests and boiler performance. Judging from the figures he quotes he has evidently struck a snag, but he is on the right tack and I wish to offer a few suggestions which may help him out.

It would make the case clearer if we knew the grate area of the boiler referred to, but it is probably about 10 sq. ft., giving a rate of combustion of 9 pounds of coal per sq. ft. of grate per hour. While 50 per cent is an excellent rate of efficiency, we will allow in this case the extreme limit of 60 per cent, and assume 12,000 B. t. u. per pound of coal as fired. This is considerably better than 12,000 B. t. u. per pound of ash- and moisture-free coal. The average amount of B. t. u. required per sq. ft. of radiation per hour is generally taken as 250.

Then we have

$$\frac{12000 \times 90 \times .60}{250} = 2552 \text{ sq. ft.}$$

as the capacity developed by this boiler when burning 90 pounds of coal per hour. This is 1,496 sq. ft., or one-third less than claimed for the boiler.

Using the figures quoted, or 12,000 B. t. u. per pound of ash and moisture-free coal and 50 per cent efficiency, we have

$$\frac{12000 \times 76.5 \times .50}{250} = 1836 \text{ sq. ft.}$$

instead of 4,048 sq. ft. as claimed. This last assumption of B. t. u. value is rather low, unless the coal is of a poor quality. A good grade of western bituminous coal will run about 12,000 B. t. u. per pound of coal as fired, 13,000 B. t. u. per pound of dry coal, and 14,000 to 14,500 B. t. u. per pound of ash- and moisture-free coal. This last is often called per pound of combustible.

The value, 3,000, as the B. t. u. transmitted per sq. ft. of heating surface, is about an average rather than a maximum. Most small boilers will evaporate from 3 to 5 lb. of water per sq. ft. of heating surface per hour, and in round numbers each pound is equivalent to 1,000 B. t. u. The American Radiator Co. in its catalog giving data from tests on its 48-in. boilers—rated at 5,700 sq. ft.—quotes an evaporation of from 3.53 to 5.60 lb. of water per sq. ft. of heating surface per hour, depending on the capacity developed. These boilers have 300 sq. ft. of heating surface, and require an evaporation of 4.75 lb. of water per hour at full load, or a transmission of 4,750 B. t. u. Using the same efficiency which was obtained with Rochester soft coal, this would require 167 lb. of coal per hour. This is equivalent to 34.1 sq. ft. of surface, or 8,525 B. t. u. per lb. of coal burned. Assuming 14,000 B. t. u. per lb. for this coal, gives

$$8525 \div 14000 = 61 \text{ per cent efficiency.}$$

It is quite possible that a boiler of the size mentioned might be made to transmit around 4,000 B. t. u. per sq. ft. of heating surface per hour, in which case it would have a capacity of

$$\frac{150 \times 4000}{250} = 2400 \text{ sq. ft. of radiation}$$

If it were able to do this on 90 lb. of coal per hour, having a B. t. u. content of 13,000 B. t. u. per pound, it would call for an efficiency of 55.6 per cent. That is

$$\frac{90 \times 13000 \times .556}{250} = 2402 \text{ sq. ft.}$$

If the efficiency were only 50 per cent, it would require 92.4 pounds of coal per hour.

Based on the information furnished, I would say this boiler might be able to develop from 50 to 60 per cent of the rating claimed for it.

Buffalo, N. Y. Frank L. Busey

THE HUMOROUS HEATING STUDENT.

Editor "Domestic Engineering":—To any reader with an appreciation of humorous writing, and we are developing a generation of jokers that bid fair to outdo the earlier writers, the attention is called to a skit in the issue of November 4, 1911, of your valuable journal, entitled: "Rabbit-like Boiler Breeds a Superabundance of Heat-Units."

According to Artemus Ward, "Figgers don't lie," and Artemus was right, they don't lie, but they can be padded to look ridiculous. I have a lurking suspicion that B. O. Iler is "kidding" (to use the current vernacular), and that we are not to take him seriously, but to classify him under the Wardian appellation, as an "amusin' cuss."

The correct method of rating a boiler is to ascertain how much water the boiler will evaporate per pound of fuel burned. The quantity of water that a boiler will evaporate in a given time, irrespective of its efficiency, denotes the boiler's capacity. There are 12,000 B. t. u. in a pound of coal (after deducting the percentage for moisture) 25 per cent of which must be burned in order to create a draft, leaving a net available of 9,000 B. t. u. per pound of coal.

Given the depth and diameter of fire pot and a general idea as to the arrangement of sections and flue travel, it would not be a difficult matter to approximate the rating of a boiler.

I would like to have B. O. Iler submit a copy of the test sheet that he is studying, omitting, of course, anything that would tend to identify the boiler.

The subject of boiler-ratings is interesting. Let us have a discussion.

Austin, Ill. Drury Lane

We don't want you just to subscribe to "Domestic Engineering." We want you to read it. We don't want you just to read it. We want you to like it real well. If you like it and think it is a good thing, push it along. You can do it by answering those questions on page 79 of our November 11th issue. Do it now.

LEGAL DECISIONS

PLUMBER CANNOT RECOVER JUDGMENT FOR WORK NOT INSPECTED.

A decision handed down by Justice Russell, at Jackson, Mich., in the case of Nowlin vs. Western, is causing a lot of discussion among plumbers, and whether or not the case will be appealed to the circuit court, will be watched with interest. The plaintiff was L. A. Nowlin, plumber, who brought suit against Charles Western for a bill of $44 for plumbing work done at the latter's home in this city. Mr. Western claimed that Mr. Nowlin promised to do the job for $20, and that later some other work was ordered in connection with it for the sum of $8.44, making a total expense of $28.44. Mr. Nowlin claims he never offered in the first place to do the job for $20, and declares the whole amount due him is $44. Mr. Western made a tender to the court of $28.44, but refused to pay any more.

The interesting part of the suit, however, is the second element of defense, and that is that the plumbing was not inspected by the city plumbing inspector, as required by law, and therefore no showing has been made that the job was properly done and the account is not collectible.

The evidence showed that Mr. Nowlin called up Plumbing Inspector Gibson and told him he had just completed a job of plumbing, but that there was only about two feet of pipe that was to be covered over with dirt, to which Mr. Gibson is said to have replied to go ahead and cover it up and it would be all right.

Justice Russell could not find where the Michigan supreme court had passed on such a question, but reference was made to an Alabama case in which the facts were parallel, and that court held that the plaintiff could not recover for the reason the work had not been officially inspected as required by law.

Justice Russell, basing his decision on that in the Alabama case, finds no cause of action in the case of Nowlin vs. Western.

MEASURE OF DAMAGES FOR DEFECTIVE WORK.

In an action by sub-contractors against a contracting company and others for the foreclosure of a mechanic's lein it appeared that the plaintiffs had entered into a subcontract for the plumbing work and to supply and place the heating apparatus in a building that had been erected. The contracting company answered by admitting the subcontract, and alleging that it had not been faithfully performed by the plaintiffs, specifying certain particulars wherein they had failed.

It was alleged in the specifications of defects that the steam-risers in what was called the exhibition room (it being a building for a convent and academy) were left badly out of plumb, that they were not uniform and not placed according to the contract. Concerning this matter the trial court found: "The plaintiffs so constructed the steam-risers in what is called the front entrance roof of said chapel that they are out of plumb as alleged by the defendant's seventh specification for damages in the answer, so that one of the said risers is out of plumb about 3 in. in a rise of about 25 ft., and the other is out of plumb about 5 in. in a rise of about 25 ft. There is no evidence to the effect that these defects in any way affect the utility of said risers of the heating plant, and no evidence was offered to show the difference in value of the building in question caused by these defects."

But the Supreme Court of Kansas, which modifies the judgment rendered for the plaintiffs, says, McCullough vs. S. J. Hayde Contracting Co., 109 Pacific Reporter, 176, that, in view of the magnitude and cost of this building and the purposes for which it was designed, it must be a grievous disappointment to its owners and the patrons of the institution to find in the front entrance to one of its principal rooms objects so out of harmony and offensive to the eye as these risers thus deflected from their true position. Beauty and symmetry, as well as utility, were doubtless taken into consideration in making the plans, and entering into the contract. This court cannot hold that the contract was complied with in this respect, nor can it approve the rule of damages suggested by the trial court. The cost of the building was not shown, but the heating and plumbing work alone amounted to over $7,000. The evidence showed that to remove the defective parts and do the work properly, as provided in the contract, and restore the building to a proper condition, would cost less than $300. If it should cost much more, it ought to be done, and the reasonable expense of doing so, in a workmanlike manner, and of complying with the contract in this respect, was a correct measure of damages in the situation here shown. The measure of damages suggested by the trial court, while applicable in a proper case, is not always exclusive even when applicable. Where only particular items are necessary to complete a contract of this nature, otherwise substantially performed, a proper measure of damages is the reasonable expense of supplying the omissions or remedying the defects. This rule was applicable to this case, where the expense of replacing the defective parts was small as compared with the contract price, and was certainly favorable to the contractor.

A Railway Which Went Nowhere.

Lunatics often assume a superiority of intellect to others which is quite amusing. A gentleman, while walking along a road, not far from the side of which there ran a railway, encountered a number of insane people out for exercise. With a nod towards the railway lines, he said to one of the lunatics:

"Where does this railway go to?"

The lunatic looked at him scornfully for a moment, and then replied:

"It don't go anywhere. We keep it here to run trains on."

Looked Just Like His Father.

William had just returned from college,resplendent in peg-top trousers, silk hosiery, a fancy waistcoat and a necktie that spoke for itself. He entered the library where his father was reading. The old gentleman looked up and surveyed his son. The longer he looked, the more disgusted he became.

"Son," he finally blurted out, "you look like a d— fool!"

Later the old Major who lived next door came in and greeted the boy heartily. "William," he said, with undisguised admiration, "you look exactly like your father did twenty-five years ago when he came back from school!"

"Yes," replied William, with a smile, "so Father was just telling me."—Everybody's.

Domestic Engineering "First-Aid-to-the-Injured"

Postal-Card Cartoon—No. X.

A Big Contract on His Hands!

PROFIT PARK
JUST A LITTLE HIGHER, GEORGE. I WOULD LOVE TO SEE THE OTHER SIDE ONCE
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There are lots of Georges trying to hoist Big-Contract Soubrettes over the fence into Profit Park. They rarely succeed and when they do they haven't got strength enough to follow the girl, and turn up their toes like the quadruped in the background. You can help show the folly of this by distributing these post-cards in your territory. Send for 25 or more. You can obtain them free of cost for the good of the cause.

Troubles With Hot-Water Piping and Hot-Water Supplies in Buildings*

By George C. Whipple, M. Am. Soc. C. E.

When one considers the fact that most houses that are supplied with running water are equipped with hot-water services as well as cold, and that a very large percentage of domestic water consumption is drawn from the hot-water taps, it is rather surprising that the quality of hot water has been discussed so seldom by waterworks engineers. Perhaps this is because hot water is almost never used for drinking; perhaps it is because such troubles as have risen have been deemed to fall within the province of the plumber rather than that of the engineer; perhaps it is because the troubles have been so intermittent, so localized and so various in character that general causes have not been sought for. Whatever the reason may be for the poverty of engineering literature on the subject, it has been a matter of common knowledge for many years that the heating of water and its passage through boilers, tanks and pipes of various metals often has a marked effect upon its quality. Conversely, hot water often has a material influence on the structures used for heating and carrying it.

The hot-water troubles usually met with are not of a hygienic character, but are physical. They are largely problems of corrosion. Yet they are practical problems, and in a number of instances that have come within the observation of the writer, they have been of a serious character. When, with the cold water satisfactory, the hot water becomes too rusty to be used for bathing, when marble bowls become discolored, when clothes in the laundry become stained, when pipes become choked with iron rust, or become so weakened through corrosion that they have to be replaced, when tenants leave their apartments and when even the most long-suffering citizens complain of the water service, the situation well deserves the name "red-water plague" that has come to be applied to it. And when such phenomena follow a change in the water-supply or changes in the method of heating and distributing the hot water, the subject is one worthy of serious investigation by water-works engineers.

Temperature Required for Domestic Service.

The hot water required for domestic service need not ordinarily have a temperature above 140 deg. F. For most purposes hot water as it is used has a lower temperature than this. In apartment-houses not provided with laundries and where all the washing is done in set tubs, higher temperatures are the rule, and they often run well above 150 deg.—in fact, sometimes the tap-water seems to be almost boiling. The range of temperature observed in hot-water systems therefore varies all the way from the temperature of the cold supply nearly up to the boiling-point.

Quantity of Hot-Water Used.

Very little is known about the quantity of water that passes through the hot-water systems of our houses, but it certainly is a substantial proportion of all the water used for domestic purposes, often a quarter or a third of it, and sometimes more. E. E. Lochridge, chief engineer of the Water Department of Springfield, Mass., has complied figures showing the consumption of hot water in an apartment-house in which reside 14 families, comprising 50 persons. His figures indicate that during the two winter months covered by the measurements, about 42 per cent of the water used passed through the hot-water system. (30.6 gal. of hot as compared with 42.0 gal. of cold water.) The amount of hot water used is greater in winter than in summer.

Methods of Heating.

In private houses the source of heat is commonly the kitchen-range, which is provided with a cast-iron water-back, or water-front, or with brass-pipes laid around the fire-box. Sometimes the furnace is used for this purpose during the winter. Recently gas-heaters have come into extensive use. These consist of a coil of copper pipe surrounded with a metal jacket, the water flowing through the pipe and the heat from the gas flame impinging on it. In apartment-houses and hotels special cast-iron heaters are provided for this service alone, or the water is heated by steam-coils placed inside the storage-tank. The apparatus is placed in the cellar and cared for by the janitor. In all cases the hot-water system includes a storage-tank, which in private houses is commonly known as the kitchen-boiler. In private houses the hot-water service is somewhat intermittent, but in apartments a constant supply is supposed to be maintained at all times, although during the night it is common to bank the fires and reduce the heat.

Materials of Construction.

The water-backs and water-fronts in kitchen-ranges are made of cast-iron. The pipes in ranges are usually of brass. In gas-heaters copper-pipes are used. The special heaters used in apartment-houses are made of cast-iron. In the tanks heated by steam the pipes are made of brass, wrought-iron or steel.

Formerly kitchen-boilers were quite generally made of copper and this metal is still used somewhat where the water is soft and where the pressures are low, as in the tank system. For the pressure system stronger boilers are required, made of wrought-iron or steel, most commonly of galvanized steel. The storage-tanks used in apartment-houses are also made of wrought-iron or steel. In high-class installations they are galvanized.

The distribution pipes are made of brass, lead and galvanized wrought-iron or steel. Brass is used in the best installations and is necessary for some waters. With other waters galvanized wrought-iron or steel gives satisfaction and is cheaper. Lead is now used but little on account of its increased cost. Not infrequently a combination of metals is used, brass being employed for the pipes between the range and the boiler and wrought-iron or steel for the service pipes between the boiler and the separate fixtures. Tin-lined lead-pipe is used to a limited extent, but Weston has shown that the tin-lining fails to protect the lead from corrosion. In some places the alloy of lead and tin is said to be used. Altogether, perhaps the most important fact to be reckoned with is the greatly increased use of steel-pipe during the last few years.

Rusty Water.

Very few of the "red-water" troubles are caused by the iron naturally present in the water or by the action of the water on the street-mains, but rather by the corrosive

*Condensed from a paper read before the American Water Works Association, at Rochester, N. Y., June 8, 1911.

effect of the water on the tanks and service-pipes through which the water flows.

Theory of Corrosion.

According to the modern and now generally accepted theory, the corrosion of iron by water and the formation of iron-rust requires (1) the presence of hydrogen ions in the water, and, (2) the presence of dissolved oxygen. Hydrogen ions are electrically-charged atoms of hydrogen. All acids form them by dissociation. Whenever they are present in solution, that solution possesses acid properties. They attack the metallic iron, which is dissolved in a ferrous condition. The oxygen dissolved in the water then oxidizes this ferrous iron and iron-rust is formed. Under certain conditions this precipitates at once. Under other conditions it apparently exists in a colloidal state; that is, in an extremely fine state of subdivision with its particles electrically charged, and precipitates only when this electrical charge is neutralized. Very little is known about this phenomenon. Certain substances tend to prevent the precipitation of colloids. Thus, peaty organic matter tends to prevent the precipitation of iron.

Iron has a natural tendency to dissolve in water as the hydrogen ion is always present in some degree. Pure water, therefore, by its dissociation tends to act as a weak acid. Even in the purest distilled water there is a splitting up, or dissociation, of some of the molecules of water into the hydrogen ion and the hydroxyl ion. Distilled water therefore acts as an acid. Iron will be dissolved, and rust will form if oxygen is present. Whatever increases the number of hydrogen ions in water increases its corrosive power. Acids do this to a marked degree. Whatever decreases the hydrogen ions reduces the corrosive power. Alkalis do this.

A further conception of the phenomenon of iron rusting is that often referred to as "the electrolytic theory of corrosion." According to this theory a sort of battery-action takes place in the water and a current of electricity is set up between the metallic iron at one spot and some other metal or some impurity in the iron at some other neighboring spot.

The increase of other metals also affects the corrosion of iron by increasing the difference of potential, and therefore the strength of the electrical currents. This is termed galvanic-action. The metals act differently in regard to the direction of the electrical currents between them and iron. Some cause the positive current to flow towards the iron, and some away from it; that is, some hasten the corrosion of iron and some retard it. The common metals are arranged in the following order of what is called the potential series: Aluminum, manganese, zinc, iron, nickel, tin, lead, hydrogen, copper. Each metal tends to protect the other metals in the series below it from going into solution, but in doing so it itself tends to dissolve. Thus, zinc protects iron. On the other hand, copper acts in an opposite way, and increases the solution of iron.

The water supplies with which the "red-water plague" has been observed may be classified as follows:

Class 1—Very soft ground waters.

Class 2—Waters in which the chlorides or the free carbonic acid are high as compared with the alkalinity.

Class 3—Very soft surface waters that are relatively high in color and contain peaty, organic matter and free carbonic acid.

Class 4—Relatively soft waters, especially high-colored waters, with which sulphate of alumina is used as a coagulant but which are not overdosed so far as the alkalinity is concerned.

Class 5—Waters overdosed with sulphate of alumina so as to render them acid.

Class 6—Waters containing originally excessive amounts of iron.

Soft Ground Waters.

Some of the ground-water supplies on Long Island are troubled with rusty hot water. These waters are invariably soft. In some cases the chlorine is rather high, varying from 10 to 25 parts per million. The dissolved carbonic acid is also high and dissolved oxygen is present. Other waters on Long Island taken from neighboring wells and similar in character, except that the hardness is high, may cause little or no rusty water. In some, oxygen is lacking.

Waters in Which the Chlorides are High But the Carbonates Low.

Many waters of this class exist along the East Atlantic Coast. As an example, the water supply of a village a few miles north of Camden may be referred to. An analysis of this water, made on April 18, 1905, showed that the chlorine was high but that the carbonates were low. The water as taken from the wells contained an insignificant amount of iron, but the water in the houses was at times more or less rusty.

Soft Colored Waters.

It is a well-known fact that soft surface waters corrode the metals used for service pipes. This matter has long received attention in connection with the subject of lead-poisoning. The soft, peaty water-supplies obtained from the English moorlands act on lead-pipes, sometimes to a serious extent. In a number of English cities, such as Birmingham, Sheffield, and elsewhere, lime is added to the water to prevent injury to the public health from lead-poisoning and to avoid the inconveniences attending the corrosion of other metals.

In 1900 Clark and Forbes, chemists of the Massachusetts State Board of Health, published a report on the corrosion of service-pipes in which the effect of dissolved carbonic acid was found to be of controlling importance. The action was found especially severe when the carbonic acid was high and the water soft.

Rusty hot water has been observed to some extent in New York City. The Crôton water is somewhat harder than the waters of New England, although it cannot be fairly classed as a hard water. Galvanized-iron and steel pipes are largely used for the hot water services. Dr Ira H. Woolson has recently called attention to the rusting of both iron and steel pipes in various public bath-houses of the city. This has also been noticed in some of the larger hotels and to some extent in private residences. Generally speaking, however, the New York City water has not caused serious trouble in this way.

In many New England cities supplied with soft surface water, experience has led to a very general use of brass and lead pipe for hot-water service, and iron-pipes have been avoided. Occasionally in recent years trouble has been experienced where galvanized-iron or steel pipes have been substituted. This has been the case in Springfield, Mass., where rusty water troubles have occurred to an increasing extent during the last few years.

Conversely, it is also a fact that in localities where the public water supplies are hard, galvanized-iron and steel pipes have been satisfactorily used for hot water supplies instead of brass. This is true of London, where

the water supply is hard, whereas in the cities of middle England, where the water supplies are softer, such pipe is avoided.

Soft Waters Treated with Alum, But Not Overdosed.

It is to the waters of this class especially that the attention of engineers has been drawn during the last years, not only because of the seriousness of the rusty water troubles that have occurred, but because, as a result of them, there has been growing up a prejudice against the use of alum as a coagulant. It should be said at the outset that such an inference should not be too hastily drawn but judgment should be reserved until the matter has been considered broadly in all its aspects.

One of the instances with which the writer is most familiar is that of the "red-water plague" at Watertown, N. Y., that has occurred since the introduction of a mechanical filter in 1905. The supply of this city is taken from the Black River. The water is an especially difficult one to treat, partly because of its high color, partly because it contains organic matter resulting from the pollution of the river by the wastes of pulp mills and partly because of its relatively low and variable alkalinity. On account of the high color and the fluctuations in the amount of organic matter and alkalinity that suddenly occur without warning, it is necessary to apply rather large amounts of sulphate of alumina. The following figures will serve to give an idea of the character of the water treated and the amount of alum that has been used:

Year	Color		Alkalinity		Alum Used, Grains per Gal.
	Raw Water.	Filtered Water.	Raw Water.	Filtered Water.	
1905.....	69	10	39	19	2.07
1906.....	62	9	39	22	2.09
1907.....	69	6	28	12	2.53
1908.....	65	7	31	14	2.34
1909.....	67	8	30	12	2.23
1910.....	70	12	28	10	2.36

Not long after the filter was put into service, complaints arose throughout the city that many of the copper-lined water-closet tanks were giving out through corrosion along the seams. This appeared to be due in part to a slightly increased conductivity of the water resulting from the alum treatment, but also to the fact that the filtered water was much clearer than the raw river water that had been previously used; so that the tanks, instead of being covered with a thick layer of slime, as they had been, were cleaner and there was greater exposure of the metal to the circulating water, a condition favoring corrosion through galvanic action. At the same time it was also found that the hot water in many of the houses was becoming rusty—so much so that in various instances the water was too dirty to be used for bathing. This was not generally true throughout the city but was noticed more in some places than in others, being especially troublesome in some houses of recent construction.

A study of the matter at this time showed that the water from the filter as it left the plant contained a very small amount of iron and that the cold water in the city contained very little more than at the filter. Such an increase in the amount of iron in water passing through the city mains is not an unusual one.

Further evidence that the corrosion of the city mains was not serious was obtained by flushing various hydrants throughout the city. The amount of rusty water drawn at such times was found to be not much greater than that normally observed.

When samples of hot water were compared with samples of cold water, however, it was found that in almost every case the hot water was more highly colored and contained more iron than the cold water. Thus, in May, 1908, hot water samples were found to have colors between 50 and 300, while, at the same time, the water as it left the filter plant and as it flowed from the cold water taps had a color of less than 5. In some instances the iron came from the hot-water faucets as flakes of rust, that would settle in a tumbler and cause a thick reddish deposite on the bottom.

The "red-water plague" was particularly severe during the winter of 1907-1908 at a time when the amount of alum used was rather large and when the alkalinity of the filtered water was low. It should be noted here that the application of the alum to the water at the Watertown filter is watched with great care. The plant is in charge of a chemist and samples of raw and filtered water are collected and analyzed four times each day and have been ever since the plant was started. These analyses show that the filtered water has always been alkaline to methyl orange, or erythrosene. At times, when the alkalinity of the raw water has been low it has been necessary to use soda ash in order to provide alkalinity for the decomposition of the alum.

These same rusty hot water phenomena have been observed in many other places besides Watertown.

A more recent instance of the "red-water plague" is that which occurred at Springfield, Mass., in the spring of 1910. This trouble is said to have begun several years before this when the supply of the city was taken from the Ludlow reservoirs. It became somewhat more serious after the new supply from the Little River was put in service. This water passes through a sand filter before being delivered to the city. At times the raw water is rather high colored and, in order to reduce this, alum is used at times in connection with the filter. The water is extremely soft. Alum was applied to the water in small quantities between April 30 and May 18, 1910, and soda ash was applied between May 6 and May 15. Between May 18 and July 15 no coagulants were applied. During this time, even when no chemicals were being used, the rusty water troubles became serious and a detailed study of the matter was made by the chief engineer of the waterworks department, Elbert E. Lochridge, and the writer.

It was found that the trouble was worst in certain apartment-houses of recent construction, although a slight trouble was general throughout the city. The color of the hot water in the apartment-houses varied all the way from 50 to 400, whereas the color of the cold water at the time ranged from 25 to 45. The hot water also contained large amounts of rusty sediment which, on analysis, was found to be composed almost entirely of oxide of iron. Iron was also present in solution or as a colloid. This caused red stains of iron-rust on white porcelain basins and in many cases made the water practically useless for all domestic purposes. Many complaints were made to the water department and the matter was the subject of much ill-feeling between tenants, janitors and landlords. In some instances it resulted in the loss of tenants. It caused pipes to become choked and in one case is said to have resulted in the bursting of a boiler.

The boilers used were generally made of cast-iron, although in the case of one or two large installations steel boilers were found. The tanks were sometimes galvan-

ized-iron or steel, sometimes made of steel blackened on the outside and apparently with no protective coat on the inside. Their capacities varied from 100 to 500 gal. In practically every case where trouble was observed the water passed through one of these unprotected steel tanks.

The pipes used for the conveyance of the hot water were found to be chiefly of galvanized-steel. Possibly in some of the older installations they may have been galvanized iron, but this could not be told from inspection. In one instance brass pipe was found in connection with a steel tank. In some of the private houses examined the hot-water piping was of brass and lead and the boilers of copper. The quality of the galvanized pipe used differed considerably in different buildings. In some cases, especially the older installations, the pipe appeared to be of much better character than in the houses more recently built, the amount of zinc on the pipe being greater and the coating smoother. These pipes of better grade were almost invariably found in connection with galvanized tanks or with tanks covered with packing. The poorer qualities of galvanized pipe were usually found associated with the unprotected steel tanks, this being apparently a cheaper installation.

When it was found that the rusty water troubles were associated with the steel tanks and galvanized pipes of poor quality, an investigation was made to ascertain the character of the inside of some of the galvanized piping used in Springfield. Samples were obtained from various plumbers and dealers, from the stock of pipe in the waterworks yard, and from pipes used in other cities. These samples were sawn asunder so as to expose the interior. The results, taken as a whole, showed extremely bad conditions. Scarcely a single specimen of a perfect pipe was obtained. In some cases there were large areas of the interior of the pipe entirely uncoated with zinc, and where the steel was exposed and coated with rust; others were spotted with pieces of mill scale embedded in the zinc coating; others were rough from the presence of dross from the spelter bath; sometimes a line was found along the seam where the coating had not adhered to the pipe, possibly on account of the failure of the acid to remove the mill scale during process of galvanizing. In several pipes where the coating was good, as far as the eye could see, microscopical and chemical tests showed the presence of pin holes where rusting might occur. In some instances a poor coating of zinc on the inside was accompanied by a poor appearance of the outside coating, but the samples as a whole showed that it was not always possible to tell the nature of the inside pipe from the appearance of the outside. A number of samples of galvanized-iron pipe obtained from different dealers and plumbers, from the water department stock and elsewhere, were carefully examined both on the outside and inside, the specimens being sawn in two for that purpose. The physical appearance of the coatings was first recorded, after which the specimens were examined with the microscope and tested for porosity by means of Walker's test and by the use of ferricyanide.

Walker's test was made as follows: The raw edges of the iron and bare spots were first coated with asphalt in order to protect them and then the specimens were placed in a solution of boiling caustic potash. If any iron remained exposed and in contact with the zinc, bubbles of hydrogen gas were generated and could be easily seen with the eye. In the case of many specimens this test was not necessary, as the bare, uncoated spots could be easily detected without it, but in other specimens, which to the eye appeared to be thoroughly coated, this test revealed the presence of pin holes. These might become foci of corrosion, and the beginning of tubercle formation. As corrosion proceeded such tiny bare spots would increase in size until finally a large area was exposed. No specimen was examined that did not show at least one or two such pin holes. The character of the coating on the outside did not always indicate the character of the coating on the inside; that is to say, a good exterior did not necessarily mean a good interior. A bad exterior, however, was invariably accompanied by a bad interior.

Waters Overdosed with Alum.

It sometimes happens with mechanical filter plants that more alum is used than can be decomposed by the alkalinity naturally present in the water. When this occurs the filtered water becomes acid and its corrosive powers are greatly increased. Such waters are liable to be the cause of the rusting of iron and steel pipes, tanks, etc., with both cold and hot water. Instances of this kind have not infrequently come to the attention of the writer.

Mechanical Filtration without Red Water Troubles.

In order to correct any misapprehension in regard to mechanical filtration, it should be stated that mechanical filters with alum used as a coagulant have been in service for many years in many cities of this country, without being the cause of any "red-water plague." But where this is the case the waters are relatively hard and the filtered water has a considerable residual alkalinity. The writer has corresponded with many engineers and chemists in various cities where mechanical filters have been used, and the dividing line between those which have caused trouble and those which have not appeared to be sharply drawn according to the hardness of the water; that is to say, the use of alum with hard water causes no trouble, whereas the use of alum with soft waters may cause serious trouble.

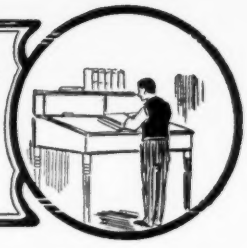
(To be continued.)

Lacking in First Attribute.

Plumber—"Well, what have ye forgotten?"
Apprentice—"I ain't forgotten nothin', boss."
Plumber—"Ye ain't! Ye'll never make a plumber."—*Judge.*

BUSINESS MANAGEMENT

NEW METHODS FOR OLD



HOW TO MAKE MORE MONEY IN THE PLUMBING BUSINESS.

Editor "Domestic Engineering":—Some time ago I noticed a correspondent asked the question in your valuable journal: "What can be done to boost business in a community filled with plumbing?" Commenting on this question I would like to make a few remarks.

There is no community that contains an average number of people of means, that is so completely filled up with good plumbing that no further opportunities exist to make more sales of plumbing goods. Any community that has enough money to support a fair amount of business in other lines can be made to produce good revenue for a good plumbing shop, if the owner is ambitious enough to be a real master, a merchant rather than a mechanic. Such a man will gain much from studying the methods men in other lines use to increase their business.

Right at the start it must be understood that building up a business costs money. The money may be represented by time spent by the owner of the business among prospective customers; by the cost of maintaining suitable display of plumbing goods to attract purchasers; or by payments for newspaper space or other forms of advertising. The returns will be proportionate to the amount spent to produce them, always assuming that the expenditure is made with definite aim after a thorough study of all the conditions.

New business can be built only by paying the price, but if the price is paid the business so secured will return it with a handsome profit. Money so spent brings the biggest kind of returns. When more master plumbers realize this, better days will begin for the trade as a whole.

Every master plumber could profit from reading and digesting an article published last winter in the "Saturday Evening Post," by James H. Collins. It briefly outlined the methods used by manufacturers of high-grade plumbing goods to create a demand for their product.

Any master plumber can apply the underlying principle to his own business on such a scale as it will afford. To build plumbing business requires only intelligent study and persistent never-ceasing work. The reward is certain. The first thing our inquiring friend should do is to take stock in himself and his business. Is he really making the most of his present opportunities?

People who have money to spend for good plumbing will spend it more freely with the master whose shop and stock indicate that he fully appreciates the dignity of his work, and who has enough get-up to treat his own property right.

It doesn't matter where our friend's shop is located, if its condition as to cleanliness and order shows that the man back of it is a business man.

Neither should he be discouraged if his stock is limited. Some of the biggest stocks of plumbing goods only serve to impress the beholder that the owner is a man without sense of value.

Three hundred dollars' worth of stock, orderly arranged and kept spotlessly clean, will make more new business than a $10,000 stock, where a search warrant is needed to find any given article, and much effort needed to remove the dust of ages when it is discovered.

As charity begins at home, so should every master plumber be a sanitarian in his own shop. True sanitation has no place for dust or dirt. A real master plumber will have a place in his shop for everything, and everything will be in its place. Everything will be spotlessly clean, and the master's time will be as well ordered as his stock. He will always have time for every important thing, because he won't waste any on useless things. When our friend has himself and his shop right, let him take an inventory of his community.

He needs to know who the people are who have money to spend for good plumbing.

Knowing them, he must study ways and means to make them appreciate good plumbing as much as he does, so they will realize what they miss by not availing themselves of the service he offers them.

Perhaps the best way to start is to pick out some individual of prominence and study his requirements till an intelligent idea is formed of his real needs.

There are very few homes of well-to-do people that do not need some appliance that a plumber can sell.

A list of the possibilities would fill a book. They run all the way from a garbage-burner or a new gas-fixture to a stationary vacuum-cleaning plant.

The ambitious master plumber will know the needs of every home in his community better than the owner, and he will lose no opportunity to demonstrate to the owner how much more comfortable he might be, if some one of these needs were filled.

A card-index made up in spare moments can be made of tremendous value in building more plumbing business.

Just by way of suggestion: It would pay any master plumber to install a monthly inspection service for his customers. For a small monthly fee an inspection of the plumbing apparatus would be made and the fee would cover minor repairs like leaky faucets, etc. Rightly handled, such a service could round up all kinds of business by suggesting to customers how various appliances would make their homes more comfortable.

The information collected by such an inspection service could be used to make up the card-index. The master of the smallest shop could at least make up a card each day. This would mean 300 cards a year, and whenever a few minutes of leisure would occur they could be spent to good advantage by considering the information on the cards. A card-index is simply a collection of information filed on cards or loose sheets so any item will be available without waste of time.

The value of a card-index is in the use made of it. In working up business a card-index helps the master

plumber put his energy where it will bring the quickest return.

Our friend must remember that going after business is just like going hunting. No hunter shoots blindly into the air hoping that a lucky shot will hit a passing bird. The hunter knows from his study of the country what game he can expect and he fires only when the game is in range. That's all there is to building plumbing or any other business.

No community is so poor that it has no plumbing prospects, and the man who is in earnest will stir up business in the most unexpected places.

A card-index serves the ambitious plumber as a fine bird-dog assists the hunter that knows how to use him.

As a suggestion for a master plumber's card-index: The cards should be of ample size so that much information can be filed without rewriting the cards.

A separate card should be used for each building. The owner's name and address should head each card and a few notes be entered to give an idea of the extent of the building covered. Then would follow a list of all the plumbing fixtures, when possible, with the manufacturer's name and the date of installation, together with the present condition. Information as to how the house is heated and lighted should also be given, and ample space should be left for noting remarks about any special apparatus the customer should have.

Such information can be made valuable in many ways. If our friend is wise he will use it to save time in making repairs that the customer orders. For instance, if Mr. Jones calls up to order a new set of grates for his heating boiler, the card-index will give the manufacturer's name and the size of the boiler, saving a trip to Mr. Jones's house to ascertain this necessary information.

Thoughtfulness of this sort cinches customers' business so no competitor can get it.

The card-index can also be used to secure the assistance of selling specialties. When a man calls with something of value a reference to the card-index will show the best customers to see and profitable business may be secured without any expenditure of time on the part of the master plumber. The card-index will also serve to furnish addresses to manufacturers who make a practice of sending matter by mail to arouse customers' interest in their products to the mutual profit of all concerned.

In fact, if our friend is wise he will build a reputation for himself by co-operating with manufacturers who have demonstrated that they deliver the goods, and he will sell no other goods but those made by reputable manufacturers.

Our friend can gain much valuable information about building plumbing business by studying the methods of live gas and electric companies. These never consider their territories filled up with appliances, but are always studying their customers' needs. The growth of their business shows the wisdom of this course. A solicitor is a valuable accessory to build plumbing business. If the compensation be arranged on a commission basis the master plumber does not increase his expense.

In every community there can be found an intelligent woman with a little spare time, and the desire to earn a little money. Such a woman can be made a gold mine, and she is well worth hunting up.

If our friend has the money to advertise in his local papers let him do so, but he need not expect much from just shooting his advertising ammunition in the air in the hope that a stray shot will hit. This sort of advertising is pretty expensive.

The proper way to advertise is first to ascertain the kind of people the advertising will reach. Then find some thing that a number of these people can use with profit. They may not know they need it, but if our friend knows they require an enameled rolled-rim tub, a new sink, hot-water supply, a garbage-burner, a soft-water pump, a suction sweeper, etc., and will write his advertisements just as though he were talking to some individual he knows with the idea of demonstrating how much he needs the article offered, sales will surely follow.

The principle of successful advertising is to be specific, to see the game and then shoot at it as straight as possible, to call the attention of some particular person to some particular want that our friend can fill.

Our friend will find it profitable to take advantage of every public gathering in his community to display some up-to-date plumbing fixture and be there in person to explain its use, keeping a list of every person who displays the least interest in it.

This list should later be added to the card-index for further attention. Publicity of this sort can be made to pay well. In fact, plumbers have lost much by failing to note the results of pure food, electric, gas, automobile and other shows. If master plumbers were as good merchants as they are proficient in other ways, every town with a dozen shops in it would have an annual plumbing show. It could be made to pay. More people buy plumbing than automobiles.

Our friend can make a woman's club or a church society help him build business. Every such organization needs money and a commission offered for business secured will get results.

All of this is just suggestion to the man who really wants to make his business grow.

The meat of the whole proposition is for the master plumber to be an alert business man, to believe that opportunities for more business exist in his community and that they are his if he will only take the time to look for them and use them when he finds them.

Springfield, Ill. Enthusiast

"DOMESTIC ENGINEERING" EDITORIALS STRIKE THE SPOT.

Editor "Domestic Engineering":—We have found your journal very instructive and interesting. Your editorials do strike the spot, and some of the contributors to the "Business Management" and "The Journeyman and His Helper" are certainly cracker-jacks. One would hardly believe, from the way the plumbing business is conducted today, that such able thinkers and writers belong to this craft.

St. Paul, Minn. Beier Bros.

Cedar Rapids, Ia.—Henceforth if Cedar Rapids people are dissatisfied with their gas-bills, they have a remedy within reach—unlike some communities. By paying 50 cents, they can have a new meter, already properly tested and garanteed to run no faster than the law allows. The gas company has deposited the meters in the office of the city plumbing inspector, and when the consumer deposits his 50 cents, Inspector McHugh and a representative of the gas company will make the change. Then if the bills don't change, he will have the satisfaction of knowing it's all his own fault.

The New Plumbing Ordinance for Joliet, Illinois

The city council of Joliet, Ill., has this month passed a new plumbing ordinance, which will be of interest particularly to those of our readers living in cities of about the same size as Joliet. This city has now a population of about 40,000. The ordinance in full follows herewith:

An Ordinance designating and describing the rules and regulations for the guidance of plumbers, in the city of Joliet, Ill.

Be it ordained by the City Council of the City of Joliet, Illinois.

Sec. 1. The building of vaults is prohibited where there is a sewer to which the connection can be made.

Sec. 2. No "range" or wash-out closets shall be allowed.

Sec. 3. Traps with secret partitions will not be allowed.

Sec. 4. Driven ferrules or combination lead bend and ferrule are prohibited.

Sec. 5. When the "Durham system" above the groundline is used, it must be constructed of wrought-iron dipped; and drainage fittings, or galvanized-iron and drainage fittings; the combination job of "Durham" and lead, or "Durham" and castiron shall not be used, except by special permission of the plumbing inspector.

Sec. 6. The least diameter of pipe allowed shall be as follows:

Closets, 4 in; urinals, 1½ in. with 1½ in. trap; sinks, 1½ in. with 1½ in. traps; basins, 1¼ in. with 1¼ and 1½ in. traps; bath-tubs, 1½ in. with drum traps; laundry-tubs, 1½ in. with drum traps; dental-chair wastes, 1½ in. with drum traps.

Sec. 7. Saddle hubs, off-set fittings over six in. center to center, and double hub fittings will not be allowed below the highest fixture on the sewer.

Sec. 8. All roof flanges to be made of No. 3 sheet-lead.

Sec. 9. Wiped joints to be made so that all tinned parts on brass or cleaned parts of lead must be covered with solder, at least ¼-in. thick all around center joints. All joints on lead pipes and connecting lead and brass shall be wiped.

Sec. 10. No lead pipe shall be wiped into heel of lead bend.

Sec. 11. Slip joints on sewer side of trap are prohibited.

Sec. 12. Every water-closet, urinal, sink, basin, bath and laundry-tub, or any other plumbing fixture, shall be effectively and separately trapped and revented, except as hereinafter provided.

Sec. 13. Basins in batteries: Not more than two basins shall waste through one trap.

Sec. 14. When alterations are made requiring the addition of three or more fixtures, including a water-closet, or a new bath-room is being installed, or building remodeled, the entire drainage system must be put in a sanitary condition.

Sec. 15. When complete bath-room or toilet fixtures are replaced by modern fixtures, the waste connections under the floor and vent pipes shall conform to these rules and regulations, the same as new buildings.

Sec. 16. All bar fixtures shall have drum traps not vented.

Sec. 17. Cleanouts must be placed at the foot of every stack, where a sewer goes through the wall, and every 35 ft. on a horizonal run.

Sec. 18. The last fixture connected to stacks over 2 ft. from center of waste opening to center of stack must be revented, excepting closets.

Sec. 19. Closets in basements shall be within 6 ft. from window opening to outside wall of the building and shall be revented with 2-in. galvanized pipe, if further away from the stack than one 5-ft. length of pipe and fitting; this pertains to one closet only; see Sec. 27 for closets in batteries of two or more.

Sec. 20. In each and every building used as a residence, or otherwise, where there is a water-closet, or closets are situated within the premises, it shall be required that at least one 4-in. vent-pipe be continued to roof and increased to 5 in. through roof; where there are one or more 4-in. vents to roof and there are other closets in different parts of the building, the revent for same shall be 2 in.; providing, where the soil-pipe from closets have more than a 12-ft. drop, the 4-in. pipe shall be carried to the roof and increased through the roof the same as other stacks. The revent may be dispensed with on water-closets when they are within one 5-ft. length of pipe and fitting of main stack, providing where there are more than two closets one above the other, on the same stack, the lower closets must be protected by reventing.

Sec. 21. Tapped "T's" on horizontal pipes will not be allowed for wastes of any kind.

Sec. 22. Sinks and basin wastes on vertical stacks may be made with tapped sanitary "T's."

Sec. 23. Drum traps may be placed on sinks in old houses without revents.

Sec. 24. All vent pipes shall be of cast-iron, lead or galvanized wrought-iron, and all fittings used on same shall be of malleable galvanized iron.

Sec. 25. Sizes of revents: In the calculation of the relation of the basins, baths or similar fixtures to water-closets, it shall be reckoned that two basins, baths or similar fixtures equal one closet.

Sec. 26. Following is a table of sizes of the revents, which shall be used when the revent does not exceed 30 ft.; when it is in excess of 30 ft., the revent shall be increased one size. The branch revent shall be above the fixture it serves, 3 ft. from floor line.

1 basin, 1¼-in. pipe.
3 basins, baths or similar fixtures, 1½-in. pipe.
6 basins, baths or similar fixtures, 2-in. pipe.
12 basins, baths, or similar fixtures, 2½-in. pipe.
24 basins, baths, or similar fixtures, 3-in. pipe.

All revents shall be continuous vents where it is possible to use same; where crown revent is used, it shall have lead pipe wiped to brass solder nipple, or combination nipple screwed into vent pipe and bent out through partition.

Sec. 27. Batteries of closets may be revented with a circuit vent, as follows:

2 closets, 2-in. pipe.
3 closets, 2½-in. pipe.
4 or 5 closets, 3-in. pipe.
6 or over, 4-in. pipe.

Vent pipe must be carried from end closet to a point above the highest fixture and enter into the main stack or go through the roof separately.

Sec. 28. The bath-tub drum trap may be revented through the basin providing the trap be within 2 ft. from bath-waste and 2 ft. from center of basin-waste. The revent shall be 1½ in. and the basin floor or S-trap 1½ in. When the continuous revent is used the basin trap may be 1¼ in. P-trap.

Sec. 29. Water-closets shall be connected to iron pipes by means of a lead bend wiped to brass ferrule or

combination ferrule, lead calked to soil-pipe. Iron bends may be used in basements under concrete floors.

Sec. 30. All lead bends, drum traps, combination ferrules and combination solder nipples shall be of extra heavy lead. All brass ferrules to be of standard weight.

Sec. 31. All cellar, floor or area drains to be Dehn's Acme Fig. 5 or equal, the trap to have a 4-in. water-seal with combined adjustable receiver, to be provided with automatic back-water valves. Garage drains to be Dehn's Peerless or equal, properly connected with local vents to carry the fumes of the grease and gasoline outside of the building.

Sec. 32. All buildings shall have a separate 6-in. tile sewer, and cast-iron pipe shall extend 2 ft. outside of building-wall and be cemented to tile.

Sec. 33. Each building shall have a separate stop-cock and Buffalo box at curb-line. Not more than one building shall be supplied from one tap, nor shall more than one building be supplied by one water meter.

Sec. 34. All service pipes shall be of extra-heavy lead pipe wiped to Mueller corporation and T. H. stop-cock or equal, and extend to curb line.

Sec. 35. All plumbing jobs shall be tested with lead work and revents connected complete, and test shall be made within 10 ft. of where sewer goes through the wall.

Sec. 36. Where it is impossible to revent a plumbing fixture, an anti-siphon trap may be used; places where these traps can be used, shall be subject to the plumbing inspector.

Sec. 37. All water-closet iron bends and connections, traps of all kinds, ferrules and combination nipples, tapped sanitary T's and cleanouts, shall be subject to approval of the plumbing inspector. Samples of the above approved articles must be kept in the office of the plumbing inspector.

All ordinances or parts of ordinances in conflict with the provisions of this ordinance are hereby repealed.

The above and foregoing ordinance was passed this 6th day of November, A. D. 1911.

Matt. Berscheid, City Clerk.

I hereby approve the above and foregoing ordinance this 7th day of November, A. D. 1911.

Edmund M. Allen, Mayor.

NEW BUSINESS VENTURES.

Richmond, Va.—The Commonwealth Heating & Contracting Co., of this city, has been incorporated with a capital of $10,000 to conduct a steam-heating business. The incorporators are: Jay W. Start, president; Charles F. Campbell, vice-president; Harry C. Glenn, secretary and treasurer, all of this city.

Jefferson, Ia.—W. E. Beazors has opened an up-to-date plumbing establishment in the Odd Fellows building in this city.

New York, N. Y.—The H. G. Smith Co. has been incorporated with a capital of $12,000 to engage in the heating and ventilating business. The incorporators are Howard G. Smith, 128 Ft. Green Pl., Brooklyn; Alfred A. Driggs, Mountain View, N. J.; Richard L. Phillips, 2 E. 128th St., New York City.

Gilbert, Minn.—Cherne & Co. have recently opened a plumbing establishment in the basement of the Cosgrove building.

Daytona, Fla.—A plumbing and electrical establishment has lately been opened by Thompson & Moore.

Fairbury, Ill.—T. J. Mahoney has recently opened a plumbing shop in the building just back of the Bank of Dwight.

PACIFIC COAST COMMENTS.

The October building record shows a gain for most of the coast cities, though in the most important places, San Francisco and Los Angeles, there was a material decrease from the September total. Los Angeles remains in the lead, and Portland, Ore., is ahead of San Francisco, though in this city there is considerably more activity than a year ago. Business is quiet at Seattle, Wash., where the total valuation of building permits is $638,895, compared with $2,093,100 for October, 1910. Locally, there is considerable large work in immediate prospect, and some improvement is expected between now and the end of the year.

The California State Board of Control is making an investigation of various kinds of fire-extinguishing apparatus, as an investigation has shown a serious need of such devices in all the State institutions.

During the last year the University of California has made a thorough test of the sanitary bubbling-cup, with such satisfactory results that the sanitary department of that institution has recently done away with the old-fashioned drinking-cups entirely, installing the bubbling cups at numerous places about the campus and in the buildings.

Proposed changes in freight rates on plumbing supplies, as provided for in the recent supplement to the Western Classification, are to become effective immediately, the State Railway Commission having decided that inasmuch as the advances proposed were greatly outnumbered by the reductions, the carriers were justified in making the changes. The rate on zinc and other lightweight bath-tubs will be practically doubled.

San Francisco.

An important steam and hot-water heating job just taken by Mangrum & Otter is for P. J. Gartland's five-story brick building at Sixteenth and Valencia streets, amounting to $12,750.

F. J. Klimm has taken a $1,775 plumbing contract for two small brick buildings to be erected on lower Market street.

The controlling interest in the Atlas Brass Works, local manufacturers of plumbers' goods, was recently taken over by H. F. Elliott, formerly secretary of the firm, who has succeeded E. Block as president and manager.

Los Angeles.

Conditions are reflected to some extent by the reports of the pipe manufacturers' agents. They state that their sales to local plumbing supply houses are extremely small at the moment, though the movement at Los Angeles is increasing. The jobbing trade is endeavoring to reduce its supplies as much as possible before the end of the year, and no large buying is to be expected until there is more firmness in the eastern markets. A peculiar condition in this market is the fact that stocks of merchant pipe are carried by practically all the wholesale hardware firms, as well as the plumbing supply houses, and the hardware dealers get a large proportion of the country trade which would in most districts go to the plumbers' supply men.

Elsewhere on the Coast.

Watts, Cal.—A school building of 12 classrooms, just completed from plans by Architect Paul V. Tuttle, is said to be, for its size, one of the best equipped in the state. The sanitary conveniences include hot and cold shower-baths for both boys and girls, with lockers connected directly with the ventilating system. The heating is provided by a plenum hot-air system, and a central vacuum-cleaning plant is installed in the basement. Fire-reels have been installed on all floors, connected with a high-pressure water system of ample capacity.

Ontario, Cal.—Bids will be received November 15th for the installation of a steam heating plant in the Central Grammar School.

Riverdale, Cal.—J. R. Turner is making arrangements to open a plumbing shop here.

Bellingham, Wash.—The plumbing, heating and electric wiring contract on the new Federal building has been awarded to Christopher & Blythe of this city on a bid of $40,000.

The Boss Talks to His New Foreman About Heating

Written by T. Twice

VIII.

You were asking the other night about how to figure the velocity of steam travel in pipes. I don't know of any better time than right now, John, to explain this to you. You may think this rather a complex proposition, but after you have figured a few problems you will find it easy. You will find it a good idea to memorize as much of this information as you can, John, as the positions that carry good salaries are looking for the man who can figure practically any heating proposition offhand, without having to dive into several books to get his information, and then probably not get the book he needed. That also looks like a hard proposition, but if you go at it in the right manner, John, you will be surprised how simple it will be. But to get back to the velocity proposition. We will assume that you wish to know the velocity of the steam travel, in feet per second, in a 4-in. pipe carrying 2,000 sq. ft. of direct radiation, with steam at 2-lb. gage-pressure.

The rule for this will be something after this style: Sq. ft. of radiation multiplied by .3, to find the lb. of steam required, then multiply lb. of steam required per hour by the volume of one lb. of steam at 2-lb. gage-pressure, which will give you the cu. ft. of steam passing through the pipe per hour; then divide this by 3,600 (which represents the seconds in one hour) which will give cu. ft. of steam passing through pipe per second; then divide the cu. ft. of steam passing through pipe per second by the area of the 4-in. pipe in square feet, and the result of the above calculations will be the velocity in feet per second, of the steam passing through the pipe. Looks like "some job," John.

We will take it in sections and then it will come easier.

We will assume that 1 sq. ft. of direct radiation will condense .3 lb. of steam per hour; then, 2,000 sq. ft. will condense 2,000x.3 = 600 lb. per hour. There we have the lb. of steam that will pass through the pipe per hour. The volume of 1 lb. of steam at 2-lb. gage-pressure is 23 cu. ft.; 600x23 = 13,800 cu. ft., which represents the cu. ft. of steam passing through the pipe per hour.

Next will be to find the cu. ft. of steam passing through the pipe per second. As there are 60 seconds in one minute, and 60 minutes in one hour, 60x60 equal 3,600, which represents the seconds in each hour. As we have 13,800 cu. ft. of steam passing through the pipe per hour, dividing this by 3,600 gives us approximately 3.83 cu. ft. of steam per second passing through the pipe. The next step will be to divide the cu. ft. of steam passing through the pipe per second by the area of the 4-in. pipe in sq. ft., and the result will be the velocity of the steam-travel in the pipe per second.

You will find by looking in a table of circles, that the area of a 4-in. circle is approximately 12.56 sq. in. Suppose you did not have such a table within convenient reach, John, what then? Right here it looks as though it were up to you to find out how to figure the area of any circle without looking in any table to do so. Just commit this number to memory, and it is the only number you will have to remember, .7854. .7854 represents the area of a 1-in. circle in sq. in. Here is the rule: To find the area of a circle, square the diameter and multiply by .7854; the result is the area of the circle in sq. in. or sq. ft. Take your 4-in. pipe. You will do this as follows: 4x4 = 16. 16x.7854 = approximately 12.56 sq. in. as the area of the 4-in. pipe.

Now to get back to the velocity proposition. We have to divide the cu. ft. of steam passing through the pipe per second, by the area of the 4-in. pipe in sq. ft. We will find the area of the 4-in. pipe in sq. ft. by dividing 12.56 sq. in. by 144 (144 being the sq. in. in one sq. ft.), which gives us approximately .087, the area in sq. ft. of the 4-in. pipe. Now dividing the cu. ft. of steam per second passing through the pipe, by the area of the 4-in. pipe in sq. ft., we have approximately 44, which represents the velocity of the steam-travel through the pipe. Quite a lengthy explanation, John, but the only way to make it clear to you. You can find the volume of one lb. of steam at other gage pressures by looking in the steam table given you earlier in our seances. Figure a few problems and get this clearly in your mind.

You were asking about the cost of bronzing or decorating radiators. I have found that estimating the cost as follows will approximate nearly correct. Take for example 600 sq. ft. of radiation. You will find it requires about 1 lb. of gold bronze, or ½ lb. of aluminum bronze, and 1 qt. of bronzing liquid, to decorate each 100 ft. of radiation. If a coat of priming paint is used (applied without oil), about one-half the above quantities will be required. Assuming that no prime coat is applied, we will require 6 lb. of gold bronze, and 1½ gal. of liquid, to decorate the 600 sq. ft. You can estimate the cost as follows:

6 lb. gold bronze @ 70c.	$ 4.20
1½ gal. liquid @ $1.20	1.80
Labor, 600 sq. ft. @ 1c. per ft.	6.00
	$12.00 approximately.

You will see that you can base your cost of decorating radiation at approximately 2 cents per sq. ft., but judgment must be used in this, John, as local conditions may affect the cost of your labor to a considerable extent.

Here is some dope that may come in useful some time:

The diameter of a circle x 3.1416, equals the circumference.

The diameter of a circle x .8862, equals the side of a square of equal area.

The diameter of a circle squared x .7854, equals the area.

The circumference of a circle divided by 3.1416, equals the diameter.

The circumference of a circle divided by 6.28318, equals the radius.

The circumference of a circle x ¼ the diameter, equals the area.

Half the circumference x ½ the diameter, equals the area.

The circumference x the diameter and divided by 4, equals the area.

The circumference x .31831 equals the diameter.

The square root of the area x 1.12837, equals the diameter.

The side of a square x 1.128, equals diameter of a circle of equal area.

Square inches x .007, equal square feet.

Cubic inches x .00058, equal cubic feet.

Area of a circle in square inches x .04328, equals gallons in one foot of depth.

Area of a circle in square feet x 6.232, equals gallons in one foot of depth.

The dope on circles may not be exactly treating on heating, John, but it is good dope to know. Pick out what appears to suit your average practice, and memorize it. I think that will do for tonight.

(To be continued.)

NEW ENGLAND NOTES.

Massachusetts.

Holyoke.—The E. H. Friedrich Co. has been awarded the contract for the plumbing and copper work and the Holyoke Valve & Hydrant Co. for the steam-heating in the new residence being erected on Northampton street for Samuel R. Whiting.

Dalton.—Joseph Bickley, jr., has opened a brass foundry on Depot street.

Grafton.—J. T. Cahill & Sons, of Worcester, have the contract for the plumbing and Holmes & Son for the heating in the nurses' new home to be erected at the state asylum here. The building completed will cost $40,000.

Milford.—Harry R. Nelson has been awarded the contract for plumbing and piping the new state armory building.

Lowell.—Welch Bros. have the contract for heating the addition to the Hildreth building now in process of construction.

Southboro.—The plumbing in the new library building will be done by G. R. Hall & Co., of Marlboro.

Melrose.—Brock Bros.' plumbing establishment on Main street has been remodeled and made more up-to-date.

Melrose.—Herbert J. Perry, dealer in hardware and plumbing supplies, has formed a partnership with Morris B. Marston under the firm name of Perry & Marston.

Lynn.—Pierce & Cox, of Boston, have the contract for the plumbing and the Commonwealth Heating Co., also of Boston, for the heating in the new Reddington street schoolhouse.

Amherst.—C. W. Dance & Son have the contract for new heaters for the Wesley Methodist church.

Great Barrington.—Walker & Chambers, of New York city, will do the heating in the new Mason Memorial library building soon to be erected.

Lowell.—Among the contracts which Welch Bros. have in hand at the present time are the installing of heaters in a two-apartment house of Walter H. Emmott on Chester street and a heater in the new house of Jesse Butterfield at Tyngsboro.

Attleboro.—James McGeough has been awarded the contract for plumbing the new Diamond factory building.

Montague.—Dewolf's plumbing establishment is soon to be moved to more commodious quarters in the Day building.

Athol.—The school committee has awarded the contract for heating the proposed new school building on Riverbend street to the Jennison Plumbing Co., of Fitchburg.

Springfield.—Edward T. Davis, who is connected with the New England Plumbing Supply Co., will be a candidate for alderman at the coming municipal election.

Lynn.—Bids for the erection, plumbing, heating and ventilating of the new eastern district grammer-school building have been received by the building commissioner, but the contracts have not yet been awarded. The figures for plumbing, heating and ventilating were as follows: Huey Bros. & Co., Boston, $12,787; for two tubular boilers $1,597 extra; Nichols Drown & Co., Lynn, for plumbing, heating and ventilating $10,866; plumbing, $3,276; boilers, $1,281; automatic control system $1,320; John F. Morgan & Son, Lynn, plumbing, heating and ventilating, $12,885; boilers, $1,944; automatic control, $1,086 additional; M. A. Dame Son Co., plumbing, heating and ventilating, $11,921; boilers, $1,525; automatic control $1,386 extra; Sawyer & Hall, plumbing, heating and ventilating, $14,505; boilers, $1,433 extra; deduct $1,323 if automatic control not used.

Connecticut.

Stamford.—Joseph Ross has been chosen secretary of the new board of examiners of plumbers recently authorized by the common council. A set of rules are soon to be promulgated.

New Britian.—Judge Platt of the United States district court has appointed an ancillary receiver for the Aetna Heating Co. Allan N. Mann, of New York, has been named as receiver.

Wallingford.—George H. Leete has sold his plumbing business to Herman A. Delius and has purchased the Northrop farm, an estate of 75 acres.

Bridgeport.—Carlson & Benson have been given the contract for plumbing in a three-apartment house which Carl A. Olson is erecting on Lee avenue. The house will be equipped with every modern convenience.

Meriden.—The town is considering the regular employment of a plumber to make repairs on schools and other public buildings, the same as a town carpenter is employed. This would do away with the necessity of calling for bids for small repair work, and is said to meet with favor among the master plumbers.

Waterbury.—W. H. Lowe has been awarded the contract for the plumbing of several cottages which are to be erected on the Watertown road for F. A. Little.

South Norwalk.—Horace R. Nash, of Elmwood avenue, town water commissioner and a local master plumber, is laid up at his home with two fractured ribs and numerous body bruises, the result of a fall from an apple tree. Mr. Nash was about 25 feet from the ground when he accidentally stepped on a dead limb and fell. It will be several weeks before he will be able to attend to his business again, his physicians say.

Stamford.—The city government has passed a resolution providing for a board of examiners of plumbers, something which the city has never before had. The board is to be composed of the sewer inspector, three master plumbers and two journeymen plumbers. It will act upon all applications for plumbers' licenses and report to the city council, which will have the sole right to grant them. The mayor is made a member of the board, to act as chairman and to have a vote only when there is a deadlock.

Collinsville.—The contract for installing a new heating system in the town hall has been awarded to D. W. Bidwell & Co.

Vermont.

Brandon.—The contract for installing a heating plant in the public library building has been placed with F. H. Button. Hot water will be used.

December 13 and 14, 1911.—The annual meeting of the National Association of Brass Manufacturers, in New York City. Headquarters at the Hotel Astor. The commissioner of this association is Wm. M. Webster, 64 W. Randolph St., Chicago.

January 24 and 25, 1912.—The 20th annual convention of the Illinois Master Plumbers' Association, at Decatur, Ill. Headquarters will be established at the St. Nicholas Hotel. The officers of the association are: President, F. U. Patterson, Springfield, Ill.; vice-president, Wm. J. Hilliard, Elmhurst, Ill.; secretary, W. C. Haviland, Aurora, Ill.; treasurer, Thomas Cody, Peoria, Ill.

May 14-17, 1912.—The sixth annual convention of the Master Boiler Makers' Association, at Pittsburgh, Pa. Headquarters will be established at the Fort Pitt Hotel.

June 25, 26 and 27, 1912.—The fourth annual meeting of the National District Heating Association, in Detroit, Mich. The officers of the association are: President, A. D. Spencer, Detroit, Mich.; first vice-president, Warren Partridge, Springfield, Ill.; second vice-president, R. D. de Wolf, Rochester, N. Y.; third vice-president, Cadwallder Evans, jr., Pittsburgh, Pa.; secretary-treasurer, D. L. Gaskill, Greenville, O.

ANNUAL MEETING OF THE NATIONAL ASSOCIATION OF BRASS MANUFACTURERS.

The annual meeting of the National Association of Brass Manufacturers will be held at the Hotel Astor in New York City, on Wednesday and Thursday, December 13th and 14th. Present advices and indications are that it will be a well attended meeting.

THE D. & T. MFG. CO. IN NEW QUARTERS.

The D. & T. Mfg. Co., manufacturers of hot-water regulators and circulators, have moved their office and factory from 1915-1917 Hamilton Ave. to 1417 Olive St., St. Louis, Mo., where they have more commodious quarters enabling them to serve their customers promptly.

CONTINENTAL RADIATOR & FOUNDRY CO. LEASES LARGE BUILDING.

The Continental Radiator & Foundry Co., St. Louis, Mo., has leased a three-story building at 1409-1411 Olive St., in that city. An up-to-date show-room will be arranged on the first floor, and the company's offices will be located on the second floor. The structure will hereafter be known as the Continental Building.

BEST MFG. CO. APPOINTS NEW REPRESENTATIVES.

Best Mfg. Co., Pittsburgh, Pa., announces the appointment of Charles E. Hague as its Philadelphia representative with headquarters at 1510 Land Title Bldg., in in that city. Mr. Hague will have charge of Eastern Pennsylvania, Baltimore and Washington (D. C.) territory. The Best company has also appointed C. L. Stickney & Co. as its representatives in the states of Washington and Oregon, with headquarters at 108 White Bldg., Seattle, Wash.

A RECORD MEETING OF THE ILLINOIS CHAPTER.

The November meeting of the Illinois Chapter of the American Society of Heating and Ventilating Engineers proved to be a record one, both in attendance and in interest. It was held at Vogelsang's, Chicago, and promptitude, even in the commencement of the feast, was the order of the evening. President Lewis and Secretary Bronaugh were early arrivals, and commenced injecting new life into the meeting from the very beginning. Wm. Scudder was the last arrival, and received a vigorous handclapping, which he acknowledged suitably. He was under a severe handicap, as he joined the gustatorial race somewhere around the chicken course. He was neck and neck with George Kirk by the time the coffee was reached, and came out an easy winner when the cigar-box was passed around.

After the united burnt-offerings of the company had descended in the form of a grand halo over President Lewis' head, he called the meeting to order. He congratulated the chapter on the excellent attendance and manifest good-fellowship of its members. Secretary Bronaugh then read the roll-call, and followed with the reading of the minutes of the last meeting. As a rule, minutes of previous meetings resemble the raking over of dry bones in a Mexican cemetery. Secretary Bronaugh's reading came, therefore, as a pleasant surprise. It was supplied with a distinct literary finish and a spice of humor here and there. The words fell mellifluously from his lips like the dropping of an April shower. In other words, everybody said it was a cracker-jack of a report.

President Lewis then laid down a series of ginger-laws concerning the duties of the committees he had appointed, most of the ginger being reserved for the chairman. The chairmen of the various committees will find that President Lewis has a most embarrassing memory, which is likely to crop out at any moment and ask what is being done. Mr. Lewis outlined the various programs for the meetings of the chapter up to May, 1912. Each one of these programs is in the hands of a special committee, and it looks as though the chapter was going to set a record for work accomplished.

August Kehm, the affable treasurer, reported a gradually swelling balance in the treasury.

George Mehring proposed a vote of greeting to Jas. A. Donnelly, vice-president of the newly formed New York Chapter, who was present and the chapter's guest. This was seconded and carried unanimously. Mr. Donnelly, in acknowledging this, said he appreciated the opportunity of being the guest of the Illinois Chapter. He described the steps taken in the formation of the New York Chapter, and the work which it is proposed to do. Several important committees have been appointed, one of which is a committee to assist the parent body in preparing for the annual meeting in New York City. The committee on tests has under consideration a series of tests of the amount of air that came out of radiators through ordinary air-valves. He believes the New York Chapter will meet what has been felt to be a distinct need of the engineering profession in the East.

August Kehm then delivered an interesting talk on his trip to Europe. He illustrated his remarks by postal-cards and sketches, displayed in a postal-projecto-scope, skilfully manipulated by the ubiquitous Robert Widdicombe. The trip commenced at London and proceeded to Germany and Switzerland, and terminated in Liverpool, the return journey being made through Brussels. Several sketches of heating installations were shown. Two of the most interesting sketches were of a steam-fitter hauling his material to the job by dog-team, and a plan of a hotel heating-installation. The steam-fitter's sketch showed the forge on the top of the dog-wagon. It appears that our German steam-fitting friends, when they reach the job, first light their pipes and then their forges, and pipes are bent to fit the job. In the case of the heating-installation, five distinct heating-plants were put in in-stead of one, in order to meet with the requirements of the stock carried by the contractor, who had nothing bigger than 4-in. pipe. There is something exceptionally pleasing about this idea. This may open up a new field of possibilities to American steam-fitters. Mr. Kehm emphasized the fact that the royal castles of Germany were heated by monstrous stoves, approximately 8 ft. high and 4 ft. wide, covered by white and colored tile, and as this heating system is defective, there will be a good opportunity for American steam-fitters when they wake up. A hearty vote of thanks was accorded to Mr. Kehm for his interesting talk, and the meeting adjourned, every member looking forward to the next one.

The meeting in December will be devoted to a consideration of auxiliary apparatus for hot-water heating systems. This was intended for November, but was deferred so that the subject could be given better consideration.

NATIONAL DISTRICT HEATING ASSOCIATION FIXES DATE FOR NEXT ANNUAL MEETING.

The executive committee of the National District Heating Association met in Detroit, Mich., on November 8 and 9. The purpose of the meeting was to fix the time and place for the fourth annual convention of this association, and to arrange the program for that event. Those in attendance were: A. D. Spencer, president of the association; R. D. DeWolf, of the Rochester Ry. & Light Co., Rochester, N. Y.; E. J. Keifer, South Bethlehem, Pa.; J. L. Hecht, Chicago, Ill.; Warren Partridge, Springfield, Ill., and D. L. Gaskill, Toledo, O., secretary of the association. After considering invitations from Niagara Falls, N. Y., Rochester, N. Y., Buffalo, N. Y., Chicago, Ill., and Detroit, Mich., the committee unanimously decided to hold the fourth annual convention in Detroit, on June 25, 26 and 27, 1912.

Papers upon the following subjects will be presented at this convention:

Depreciation in Underground Distribution Systems.

Operation of Turbines and Reciprocating Engines in Connection with Steam Heating Work.

Description of a Combined Steam Heating, Ice Making and Electric Power System.

Radiation Tests.

Heat Losses in Steam Distributing Systems.

Description of a Large Hot Water Heating System.

Quality of Steam Supply as Affected by the Use of Superheat at Station.

De-centralized Heating Plants.

Relative Economies of One and Two-Pipe Heating Systems in Buildings.

Sources of Trouble in Customer's Installations.

Thermo-Dynamic Economy of Combined Power and Heating Systems.

Different Systems of Underground Construction.

One paper to be presented by the Cleveland Electric Illuminating Co., subject not yet announced.

The membership shows a substantial increase since the convention held in Pittsburgh, and the interest and enthusiasm in the work is also increasing.

CELEBRATION OF THE N. O. NELSON MFG. CO., ST. LOUIS, MO.

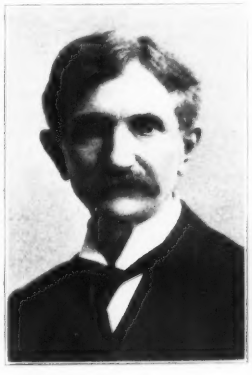
N. O. Nelson Mfg. Co., 10th and Chestnut streets, St. Louis, Mo., celebrated three important dates at one time on November 10. These were the 21st anniversary of the founding of the company's factories at Leclaire, 26 years of profit-sharing carried on by the company, and 40 years of connection with the business by N. O. Nelson. The meeting was largely attended, as a result of the invitations sent out to friends of the company. Among the speakers at the banquet were: Francis J. Torrance, first vice-president of the Standard Sanitary Mfg. Co., Pittsburgh; Albert V. Conradt, secretary and treasurer of the Great Western Pottery Co., Kokomo, Ind.; Archie M. Maddock, of the Thomas Maddock's Sons Co., Trenton, N. J.; Adolph Mueller, president of the H. Mueller Mfg. Co., Decatur, Ill.; S. O. Dugger, of the McCrum-Howell Co., Chicago; George Day, of the Youngstown Sheet & Tube Co., Youngstown, O.; Mr. Stoddard, of the Detroit Range Boiler Co., Detroit, Mich.; and J. E. Hafner, manager of the Soil-Pipe plant at Bessemer, Ala.

Letters expressing regret over the writers' inability to be present were received and read from the following: Theodore Ahrens, president of the Standard Sanitary Mfg. Co., Pittsburgh, Pa.; John Noone, Standard Sanitary Mfg. Co., Chicago; John Duncan, Wheeling Steel & Iron Co., Wheeling, W. Va.; Edward Wooster, vice-president of the National Tube Co., Pittsburgh; John J. Foy, representative of the N. O. Nelson Mfg. Co. at Los Angeles, Cal.

N. O. Nelson, the founder of the enterprise, is a remarkable character. He would be considered so in any business in which he was engaged. He is a philanthropist born, and a brief consideration of the profit-sharing plan adopted and of his co-operative community at Leclaire, is of interest.

It is needless to say that profit-sharing and community interest were not originated by N. O. Nelson, but the variety in men lies largely in their willingness and their ability to take hold of the good things that there are before them, and utilize them for the benefit of others. It is not necessary for any one to despair of doing good because of lack of originality. Examples are numerous to follow.

Profit-sharing with employees was adopted by the Nelson company 25 years ago, and five years later the village of Leclaire was founded. The company itself became completely co-operative in 1905 by taking the customers into the plan and paying interest only for capital. This co-operative commonwealth includes now several thousand members. In the business-plan and town-plan as successfully adopted there are undoubtedly far-reaching lessons on the problems of civilization itself. The ceaseless conflicts between labor and capital and the unsanitary congestion constantly occurring in cities, have prob-



N. O. Nelson, St. Louis, Mo.

ably more to do with the life-spring of our national body than tariff or trusts or yellow perils.

Since 1871 the co-operative schemes in England have grown apace, and the co-operative stores and factories in that country have no less than 3,000,000 members with sales of $500,000,000 and net profits of over $60,000,000. Denmark, Germany, Austria and Ireland have many co-operative organizations.

Profit-sharing is that form of co-operation in which the capital and management are already provided, and employees are given a share of the profits.

Mr. Nelson, prior to the adoption of the profit-sharing plan, had become impressed with the evils of repeated strikes, and the ill-feeling and waste resulting from the hiring system. At that time he was led to study the plan used by the Leclaire Co. in Paris and the Godin Co. in Guise, France. The plan appealed to him and in the spring of 1886 the Nelson pay-envelopes contained a slip stating that after allowing interest on capital, profits would be pro-rated on wages and capital. The first year was a poor one, and the dividend was 5 per cent. The next year it was 10 per cent, and the percentage has varied from 8 to 10 till 1905. In that year the customers were included in the plan, and interest allowed on capital only. In the six completed years under the new arrangement, dividends have been from 10 to 30 per cent on wages, and from 15 to 45 per cent on gross profits of regular customers' purchases. Since 1888 dividends have been paid in stock.

In 1890 Mr. Nelson found a satisfactory location adjoining Edwardsville, Ill., 18 miles from St. Louis. The 125 acres, equal to 60 city blocks, comprising several fields of rich land, with railroad and trolley facilities to St. Louis, offer a splendid situation for modern factories and operatives' homes. In November, 1890, four brick factories had been erected, a club-house with room for lectures, kindergarten, dancing, bowling-alleys and billiard room, and several residences, and there had been laid out streets in park form and a baseball ground. There are no rules or restrictions, no policemen, no mayor, no crime, no idlers, no divorces, and few deaths. Leclaire has provided for its inhabitants steady work, plenty of fun, many weddings, and lots of children. Most of the people own their own homes and considerable stock in the factories. A co-operative store owned by about 150 mem-

bers and open to all, regardless of where they live, supplies the ordinary wants and returns regularly 8 per cent of dividends on the purchases, besides interest on the shares and a growing surplus.

It would be possible to write an article of considerable length, including many of the minor but not less important details. The above sketch at least will convey to the reader a distinct impression that the N. C. Nelson Co. has just cause for celebration.

EXHIBIT OF LEADER WATER SYSTEMS AT ILLINOIS STATE FAIR.

The largest fair in point of exhibits ever conducted by the Fair Association of Illinois was held at Springfield, Sept. 29, to Oct 7, 1911. In spite of the continued rains, a large crowd daily called at the exhibit of Leader water systems in the machinery section.

A large tent was provided and within it, on solid foundations, were placed a number of complete Leader water systems in actual operation. The noiseless operation of the electrically driven centrifugal outfit Fig. 187-E, which confronted the visitors upon entering, attracted a great deal of attention and favorable comment. It was automatically started and stopped by the Leader electric controller, the pressure of the water after being pumped to the tank acting against the diaphragm of the controller.

A complete direct connected pumping outfit Fig. 181-E was shown in working order. The quiet action of the

Interesting Exhibit of Leader Iron Works at the Springfield Fair.

two h. p. engine and the close-geared pump made many friends for this outfit. The Leader automatic circuit breaker for stopping the engine when sufficient pressure had been attained in the tank, was a feature of this exhibit.

The new hand power outfit, Fig. 102-E, was well shown, using a 30 in. x 6 ft. vertical tank. The close connection of the pump to the tank, eliminating many of the usual installation troubles, and the several decided improvements in pump construction, were favorably commented upon by the visitors.

A row of seven Leader-Domestic gasoline engines of different sizes, each in operation under its own power, was an effective means of showing the utility and high grade construction of this line.

The exhibit was a success in every way, and the results in sales by the Illinois dealers should be the better for it in the months to come.

AN INTERESTING LOOSE-LEAF CATALOG.

The Great Western Pottery Co., Kokomo, Ind., has just completed a magnificent loose-leaf catalog containing 236 pages. It illustrates and describes the many products of the company most completely, including vitreous lavatories, bowls, several types of flush-valves and seat-action closets. An interesting feature in the catalog's make-up is that the first two figures of each lavatory's number give the width of the lavatory.

THE D. & M. COLLAPSIBLE LAUNDRY-TRAY FRAME.

The D. & M. collapsible frame shown in the accompanying illustration is a new support for laundry-trays, which has recently been placed on the market by the D. & M. Specialty Co., 648-652 Huron Road, S. E., Cleveland, O.

The D. & M. Collapsible Laundry-Tray Frame.

It combines neatness and strength with common sense and it is rapidly gaining popularity among plumbers, owing to the fact that it eliminates all trouble in setting laundry-trays. It requires no bracing, either before or after the tray is set. The frame is simply placed on the floor and the tray put on its top, making it possible for one man to do what formerly required two or more men. The frame is made in the regulation height, 16 in., and it is constructed to support cement, Granitine, Alberene, Euclid and Lakewood stone as well as other makes of soapstone trays, and it is also made in regular sizes to accommodate any length of tray, the 72-in. size for a three-part tray being made with an additional leg in the center. Special sizes can be made to order. The frame is furnished in black japanned finish, unless otherwise specified. It can also be furnished galvanized. On account of its collapsible feature it takes but little space in the stock-room. It can be folded by the removal of the

The D. & M. Collapsible Laundry-Tray Frame Installed.

four bolts in the side-braces. Taken all in all it is a very ingenious and practical device, that is bound to appeal strongly to all plumbers. The manufacturers will be glad to send those interested full particulars upon request mentioning "Domestic Engineering."

THE "NEW IDEA" BUBBLING DEVICE.

Drinking devices of every kind and price are now on the market, ready to catch the eye of those intending to invest in such fixtures as a result of public disapproval of the common drinking-cup.

The Trenton Potteries Co. announces that it has adopted a bubbling-device worthy of being sold by reliable houses. This device has but recently been patented and completely covers the necessary requirements of what a drinking-fountain really should be. It has been named "The New Idea" and is so constructed as to fit any style porcelain or china fountain made by this manufacturer.

The illustration shows the bubbling-cup attached to The Trenton Potteries Co's. vitreous china integral trap fountain—a most substantial and attractive little fixture.

The difficulty most plumbers encounter is the variation in the water-pressure of different localities. "The New Idea" is well taken care of in this respect. The loose valve, visible at the elbow of the supply-pipe, may be used to shut off the water-supply when necessary. The other valve which appears just below the push-button is

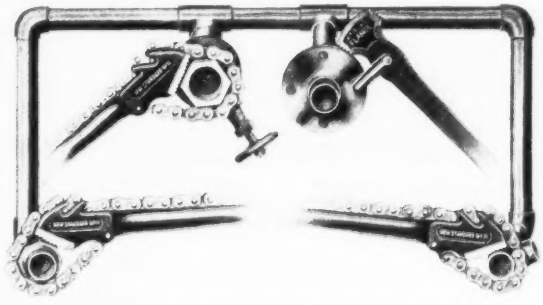
The "New Idea" Bubbling Device.

to regulate the flow of water according to the pressure. This difficulty is thus overcome successfully and the plumber will appreciate its solution by this device.

A needle-point at the water-supply prevents children from squirting the water around the room. If it is desired to draw a cup of water, the spigot-arrangement, which also serves as an overflow, will supply the demand. Further information about this fixture may be secured by addressing The Trenton Potteries Co., Trenton, N. J.

THE NEW IMPROVED BROCK CHAIN-WRENCH.

The Brock Wrench Mfg. Co., 18 Dey St., New York City, has been making wrenches for 15 years, its former president, the late Mr. Brock, being the patentee of the



Several Views of the New Improved Brock Chain-Wrench.

original old-style Brock wrench. This company has now brought out an improved chain-wrench containing several new ideas, one of these being the half-link adjustment, which enables the user to apply the wrench on any style of pipe-fitting, valve or nut. The wrench has an inserted, removable jaw, not held by bolts that break, but dovetailed in the head of the wrench, which no amount of pull or strain will loosen. This is one of the wrenches that can be used in doing a complete job of pipe-fitting without the aid of any other wrench. On account of the large number of these wrenches being produced at one time, the company is enabled to supply them at an extremely moderate price. Jobbers who are not yet acquainted with this wrench can obtain a sample wrench from the manufacturer on request, mentioning "Domestic Engineering," and plumbing and heating contractors can obtain full particulars upon the same terms.

LA BELLE IRON WORKS TO HAVE SAN FRANCISCO OFFICE.

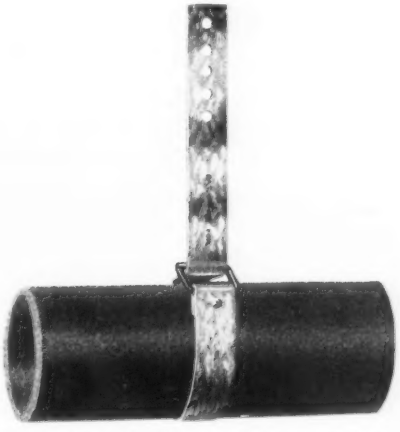
It is now definitely announced that a coast office is to be established in San Francisco by the LaBelle Iron Works, Steubenville, O., to be in charge of a man from the eastern office. This company's line of pipe, etc., has formerly been handled by the C. W. Pike Co., Postal Telegraph building. The latter company will continue in the pipe business, having taken up another line, and on November 1st the company opened an office in the Story building, Los Angeles.

Norfolk, Nebr.—J. H. Digman has sold his plumbing establishment to D. A. Daubert, of Fremont, well known in this locality. Mr. Digman intends to move to Texas.

Falls City, Nebr.—Clifford Parcell, recently of Colorado, has opened a plumbing shop in the building formerly occupied by the Tribune.

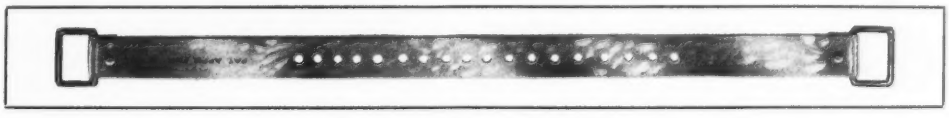
THE J. & H. ADJUSTABLE PIPE-HANGER STRAP.

Johnson & Hager, 172 Notre Dame Ave., Dayton, O., have placed on the market a new pipe-hanger device under the name of the J. & H. strap-hanger, which has been most favorably received wherever it has been introduced.



The J. & H. Pipe-Hanger Strap on the Pipe.

The accompanying illustrations give the reader a good idea of this new hanger, which can be adjusted to any size pipe quicker than most hangers that are made to fit only one size. This new hanger can be used on concrete or wood, and it is made of galvanized steel strong enough to carry pipe up to 4 in. with safety. The length of each strap is 42 in., the 18 in. in the center being punched for nails as shown in the illustration. It is safe to say that in ordinary work it is possible to make two hangers from each strap. Prices and further particulars will be furnished promptly by the manufacturers upon request mentioning "Domestic Engineering."



The J. & H. Pipe-Hanger Strap.

THE METAL MARKET

INCREASED OUTPUT OF PIG-IRON.

The output of pig-iron during October was, according to reliable statistics, 2,100,000 tons. This is an increase of over 100,000 tons compared with September; more than 200,000 tons larger than August, and 300,000 tons larger than July, when the low point of the year was reached. Not only this, but stocks have again been reduced at furnaces. The unusual feature of the situation is that when the increased production lessened the supply on hand, prices did not move. In fact, the price of pig-iron is slightly easier than a week ago in some quarters, and consumers are not at all anxious to buy for future requirements. The reduction has been in the price of No. 2 Northern foundry, Chicago, which is now $14.10 compared with $14.35 last week. New England foundries are not anxious to buy, although there has been more business done by the manufacturers. Practically all along the Atlantic Coast furnace interests are not securing any amount of new business. Such business that has been done for 1912 delivery has been at the same price as for this year's delivery. The most interesting thing in the iron and steel market has been the buying of rolling stock by the railways. There has been a great deal of equipment purchased in the last fortnight; this will call for much steel-making iron.

The suit against the United States Steel Corporation does not excite the same interest as a week ago. The fact that the American Tobacco Co. was allowed to reorganize so easily and readjust its holdings leads to the belief that this corporation will have a comparatively easy time of it. There is, however, another aspect to this situation. People of the country are bent on regulating corporations, and if the Sherman Law cannot do it, there is likely to be something put on the statute books that will be more drastic even than this.

Quotations are as follows:

No. 2 Southern foundry, Birmingham	$10.00
No. 1 Northern foundry, New York	$15.25 to 15.50
No. 2 X Northern foundry, New York	15.00 to 15.25
No. 2 plain, Northern foundry, New York	14.50 to 14.75
No. 2 Northern foundry, Chicago	14.10 to 14.50

OLD IRON.

Business is exceedingly quiet, and there is no new demand for scrap of any kind. Holders of scrap are disposed to wait developments. Quotations for New York delivery are as follows:

No. 1 yard wrought, long	$10.25 to $10.75
No. 1 yard wrought, short	9.25 to 9.75
Heavy-melting steel scrap	9.25 to 9.50
Machinery cast	10.00 to 10.50
Wrought pipes and tubes	8.50 to 9.00
Malleable castings	9.75 to 10.25
Wrought turnings	5.75 to 6.25
Stove plate	7.75 to 8.25
Light iron	3.75 to 4.25

AN IMPROVED DEMAND FOR COPPER.

The statistics complied by the Copper Producers' Association the first of the month were more favorable than expected in that they show a reduction of stocks of about 6,000,000 tons. The production was larger than in September, but smaller than the corresponding month last year. Stocks now in the hands of producers amount to 135,000,000 lb. compared with 139,000,000 lb. at the corresponding time last year. There seems to be little doubt that exports during November will show a decrease owing to the better demand from Germany, and domestic buying has already commenced on a large scale. Numerous sales have been made during the last week for round lots, and it is probable that fully 100,000,000 lb. of copper have been sold within a fortnight. With the winter season it cannot be expected that production will be as large as during the summer, and a further reduction in stocks may become apparent later in the year. Prices have advanced slightly—about one-eighth of a cent. Lake is now offered at 12.50 cents and Electrolytic at 12.37½ cents.

PIG TIN.

The market has been manipulated without any regard to the eternal fitness of things, and the Bull Syndicate in London will soon lose what little sympathy there is left for it. Sales are being made in New York at around 42 cents.

SPELTER.

There is a scarcity of metal for early delivery, and prices are unchanged at 6.35 cents New York and 6.20 cents St. Louis.

LEAD.

Business is fairly active, and there is a scarcity of lead for prompt shipment. Prices remain unchanged at 4.25 cents New York and 4.15 cents St. Louis.

STATE SANITARY DEPARTMENT DRAFTS PLUMBING ORDINANCE FOR MANHATTAN, KANS.

An ordinance which, if ever passed, will make it necessary for the city of Manhattan, Kans., to employ a licensed plumber as plumbing inspector, whose duty it will be to see that all plumbing is done in accordance with specifications set forth in the said ordinance, was read at the council meeting last week.

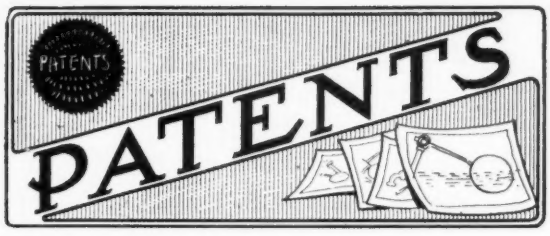
The State Sanitary Department drafted the ordinance and suggests that it is an ideal ordinance for cities of Manhattan's population.

Some of its provisions require that certain kinds of material shall be used in constructing the plumbing work in all residences and that before connection with any sewer may be made it will be necessary to get a permit from the city engineer. The latter also is to have the authority to appoint a plumber who is supposed to be capable of inspecting all plumbing.

Because of the length of the proposed ordinance—it contains about 30 sections—the council decided to hold it up until some future meeting when all sections will be discussed separately.

It is feared by many that if this ordinance passes, a vast amount of plumbing now installed will be ordered torn out or inspected and people put to the expense of reinstalling sanitary plumbing.

Did you answer the questions for our business-report in the "Humdinger" issue? If not, go to it. You can be an associate editor of "Domestic Engineering" now. When you write, sign up as Associate Editor and see how it looks.

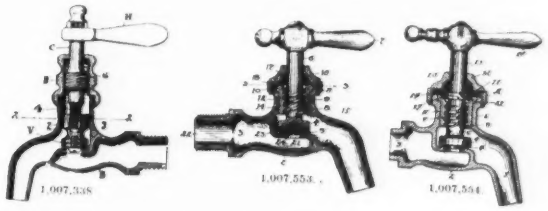


Plumbing Department.

1,007,338. Quick-Closing Faucet. John A. Cochrane and David H. Cochrane, Cleveland, O. A faucet body having a tubular neck on its top open above and provided with vertical grooves in its side, a cap threaded on said neck and having an annular shoulder seated on said neck and narrowed above said shoulder and provided with a quadruple quick thread inside and packing above said thread, in combinati n with a valve stem having a relatively enlarged body portion 6 between its ends provided with a quadruple right-hand thread engaged in the said thread in said cap and ribs 3 engaged in said grooves and provided with a relatively reduced extremity provided with a left-hand screw of less inclination than said quadruple thread, a valve with a threaded socket in which said extremity is rotatably engaged, and a seat for said valve, said right and left-hand threads being adapted to work in unison downward to effect a quick opening and closing of the valve with about a quarter-stroke of the handle.

1,007,553. Bibb and Cock. Joseph H. Glauber, Cleveland, O. A bibb or cock body having a main water passage and a valve seat, a valve and a rotatable stem therefor having a quick-acting thread externally, a handle for said stem and a removable sleeve rotatably secured within said body having an internal quick-acting thread co-operatively engaged with said rotatable stem and said parts being adapted to limit rotation of the handle to a partial turn and permit joint rotation of the sleeve and stem by a continued rotation of the handle in primary setting and aligning operations.

1,007,554. Faucet or Cock. Joseph H. Glauber, Cleveland, O. In a faucet or cock of the quick-opening and closing type, a valve stem and a self-adjustable gripping device having constant tightening engagement with the stem to hold the same in any set position.



1,007,476. Water-Softening Apparatus. Kent W. Bartlett, Madison, Wis., assignor to Northern Water Softener Co., a corporation of Maine. An apparatus of the class described including a tank, a source of liquid supply therefor, a bucket adapted to receive liquid discharged from said source, fluid-conducting means for communication with the fluid in said bucket for permitting the flow of fluid from the bucket to lighten the bucket, and mechanism preventing and permitting the flow of fluid from said source to said tank independently of the bucket and governed by said bucket.

1,007,463. Plumbing Structure. Charles F. Madden, Green Bay, Wis. A floor-drain comprising two main parts, one of which is a pipe member, bent to provide a deep seal bend with an inlet-leg terminating at its top with a horizontal opening at floor level, and its opposite leg terminating in a lateral opening just below the end plane of the first said leg, said inlet-leg having a lateral inlet-opening near the level of the lateral outlet-opening of the opposite leg; and the other principal part compris-

"A Reputation Builder"

¶ With these words a progressive heating contractor designated the TRITON PACKLESS WATER VALVE. This man saw the possibilities in the valve when it was first put on the market. He recognized the fact that the owner would prefer it to the ordinary competitive type. He laid in a stock; figured them in all of his estimates on hot water plans; took particular pains to explain to the owner that with these valves, he need never fear any leakage around the stem, or pay for any repacking. The owners were quick to recognize the superiority of the valve, and saw at a glance that it cost the contractor more money, were impressed with the quality of the material that the man was figuring, and gave him their work at a decided preference.

¶ The confidence instilled through the use of high-grade material insures prompt settlements of contracts, satisfied customers, and a growing reputation for superior work.

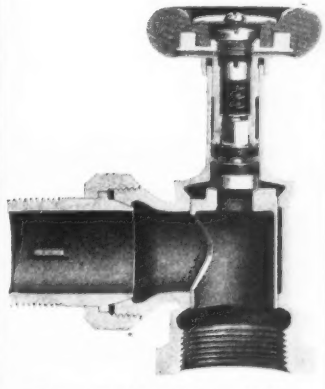
Are you using this method of getting the profit you should on your work? Better try it out. Prices and full descriptive matter gladly furnished on request.

UNITED STATES RADIATOR CORPORATION

General Offices: —Detroit, Mich.

BRANCHES:

New York Boston Philadelphia Baltimore Pittsburg Chicago Detroit Minneapolis St. Louis Omaha Kansas City Washington

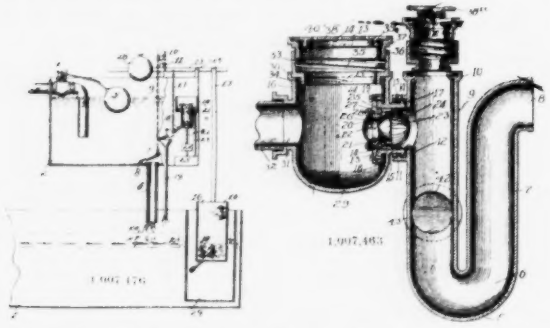


Triton Packless Water Valve

¶ A valve which positively will not leak air, or water around the stem, and which will never require repacking. Quick opening, non-sticking shell, accurately machined joints, threads and connections.

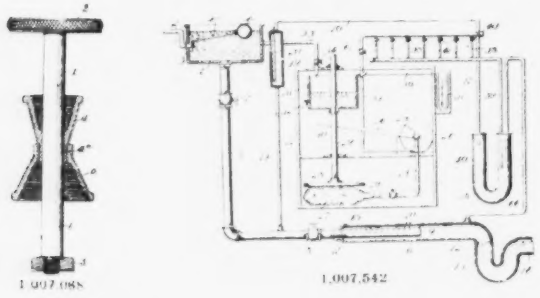
¶ A handsome and substantial appearing valve.

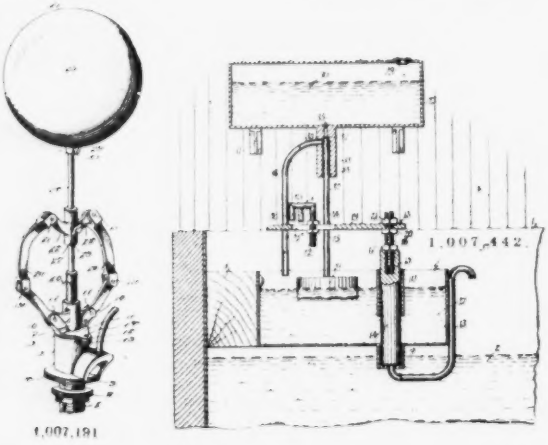
ing a catch-basin having an inlet-opening at its end at floor-level, and having a single lateral outlet-opening above its bottom, communicating with the side-opening of the inlet-leg of the pipe member.



1,007,068. Valve-Seating Tool. Louis V. Cornelius, Grand Rapids, Mich. A valve-seating tool, comprising a shaft having a cutter attached, means for rotating the shaft, an internally and externally screw-threaded truncated cone having a tubular portion closely engaging the shaft to guide the same and externally threaded, and a larger internally and externally threaded truncated cone having its small end internally threaded to receive reversibly the extension on the small cone.

1,007,542. Water and Sewage Purification. Carl Roger Darnall, Washington, D. C. The combination of a mixing-chamber, a water-pipe leading thereinto, a gas supply, a gas-pipe leading from the gas supply to the mixing-chamber and formed in two members having their adjacent ends at different elevations, a body of liquid having its surface normally on a level between said ends,





a pipe leading to said liquid from the water-supply pipe, and means within said pipe whereby air will be compressed, when the flow of water is arrested, against the said body of liquid to force the same around and into the end of the higher member of the gas-pipe and thereby arrest the flow of gas.

1,007,191. Float-Valve. Thomas F. Foley, Washington, D. C. In a device for the purpose set forth, a vertically movable valve, a float positioned directly above the valve, a rod for the float, a vertically adjustable member having oppositely disposed arms connected with the float-rod, said float-rod having its lower portion loosely positioned within the upper portion of the valve, pivoted arms for actuating the valve, and link members connected with the said pivoted arms and with the arms of the adjustable member upon the valve stem.

1,007,442. Automatic Disinfecting Device. Thomas Francis Hahesy, Chelsea, Mass. The combination of a flushing-tank, a tank adapted to contain a disinfectant and provided with a pocket and a cylindrical member, an outlet pipe extending from said pocket, a lever on the flushing-tank, and a bar extending over the second-named tank having a hook thereon in engagement with the said lever on the flushing-tank, a piston entering the said pocket and the said cylindrical member, whereby as the lever is operated, an amount of disinfectant will be supplied to the flushing-tank.

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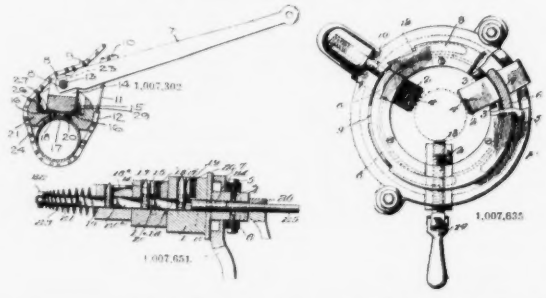
1,007,302. Wrench. Robert V. McMullen, Coalinga, Cal. A wrench comprising a handle, a jaw pivotally connected upon the handle, a chain connected with the handle for co-operation with the jaw, a casing connected with the handle for movement into and out of position to extend beyond the acting face of the jaw, and means for holding the casing yieldably in such position.



1,007,635. Work-Holder for Pipe-Threading Tools. Milton W. Bechtel, Warren, O., assignor to the Borden Co., Warren, O., a corporation of Ohio. A work-holder comprising a housing having a series of radial guideways, a series of pipe-clamping jaws movable in said guideways, each jaw having pipe engaging surfaces on one end and having grooves in a plurality of its sides, such grooves being located different distances from the pipe engaging end of the jaw, a plate rotatably mounted on the housing having a series of eccentric ribs taking in said grooves, spaces being formed between the contiguous ends of adjacent ribs, a plate fixed to said housing and having a cut-out, and a spring-pressed pin carried by said rotatable plate fitting in said cut-out to limit the movements of said rotatable plate.

1,007,651. Pipe-Cutter. Oscar J. Erickson, Benson, Minn. In a tube-cutter, the combination of a cylindrical barrel, a cutter disposed radially of said barrel and projecting within a central bore formed therein, a wedge member engaging the inner end of said cutter, a beveled recess formed on the peripheral surface of said barrel, a spring engaging said cutter, tending to hold same normally in its innermost position, the free end of said spring terminating adjacent said beveled recess, and a beveled key operating in said recess and engaging said spring, substantially as described.

What's that a-humming? Hush you chile! That's the Humdinger pot a-boilin. We are puttin' the seasonin' in right now.